Final
Site-Specific Field Sampling Plan
Site-Specific Safety and Health Plan and
Site-Specific Unexploded Ordnance Safety Plan
Attachments
Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range

Fort McClellan
Calhoun County, Alabama

Task Orders CK04 and CK10
Contract No. DACA21-96-D-0018
IT Project Nos. 773191/796887

December 2000

Revision 1

Final
Site-Specific Field Sampling Plan Attachment
Site Investigation at Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range

Fort McClellan
Calhoun County, Alabama

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Revision 1

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See Attachment 1 for the list of abbreviations and acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Orders CK04 and CK10, IT Corporation (IT) will conduct site investigation (SI) activities at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, at Fort McClellan (FTMC), Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at these sites. The purpose of this site-specific field sampling plan is to provide technical guidance for sampling activities at the Ranges West of Iron Mountain Road.

The Ranges West of Iron Mountain Road includes the area in the western portion of the Main Post from Summerall Gate Road south to the area west of Yahoo Lake toward Blue Mountain. The east-west limits of the area are from the western boundary of Main Post at the Jacksonville-Anniston Highway east to Iron Mountain Road, north of Yahoo Lake. However, Parcel 232Q-X extends across Iron Mountain Road in the northern section of the study area, and is included in this SI.

Most of the firing lines for the ranges have been identified from the January 1998 Environmental Science and Engineering, Inc. (ESE), *Final Environmental Baseline Survey* or in the U.S. Army Corps of Engineers (USACE) 1999 *Archives Search Report, Maps* along with range safety fans that include probable impact areas. However, because most of the ranges overlap, it is very difficult to separate the impact areas of overlapping ranges. Therefore, the SI for the Ranges West of Iron Mountain Road will focus on individual firing lines, impact areas, and areas of activities where possible contamination may exist rather than investigating each range or parcel as a unit.

Several of the ranges included in this study area have safety fans that exceed the likely impact areas based on the type of munitions reportedly used at each range. However, the SI will focus sample locations in the areas of the probable firing lines and the probable impact areas. Sample locations will not be proposed over the entire safety fans. Because of the number of ranges in this study area and the overlapping of ranges, impact areas will not be linked to specific firing lines in the investigation.

Some of the actual impact areas were determined in the study area for this SI. Information for the location of the actual impact areas was collected from several sources. These sources include the following:

- Presentation to the Base Realignment and Closure Cleanup Team by Foster Wheeler Environmental Corporation, May 17, 2000.
- Unexploded ordnance (UXO) field survey data obtained by EOD Technology, Inc., that identified areas of dense munitions fragments and UXO during UXO surveys to clear the eastern bypass right-of-way.
- Field observations by IT during site walks in July 2000.

Although some of the parcels extend beyond the western Main Post boundary, the investigation will not extend outside of the current FTMC Main Post boundary. The ranges at Parcels 200Q and 228Q and possibly other ranges in this study area have probable impact areas on the east side of Iron Mountain Road and overlap other former ranges located east of Iron Mountain Road. The probable impact areas for Parcels 200Q and 228Q will be investigated with the ranges located east of Iron Mountain Road. Therefore, with the exception of Parcel 232Q-X in the northern part of the study area, the study area for this SI will not extend to the east beyond Iron Mountain Road.

The elevation in this study area ranges from about 790 feet above mean sea level (msl) to 1,270 feet at the top of Iron Mountain in the central-eastern portion of the area. The highest elevation of the study area is a ridge along the western edge of Iron Mountain Road. This ridge, which runs primarily north and south, slopes to the west and northwest and connects Iron Mountain and Wheeler Hill. This ridge appears to have been a backstop to most of the ranges in this study area. The orientation of most of the ranges are northwest to southeast or west to east and appear to use Iron Mountain, Wheeler Hill, and connecting ridges as backstops. However, one range (Parcel 229, Former Rocket Launcher Range) in the study area is oriented northeast to southwest.

Iron Mountain, at 1,270 feet msl, and Wheeler Hill, at about 1,260 feet msl, are the tallest mountains within the central-eastern and southeastern areas of the Ranges West of Iron Mountain Road. Three mountains comprise the southern limit to the Ranges West of Iron Mountain Road including, west to east, Blue Mountain (1,516 feet msl), Reynolds Hill (1,378 feet msl), and

Cable Hill (about 1,240 feet msl). Most of the intermittent streams that drain the study area flow to the northwest.

Area 45, Parcel 232Q-X and Adjacent Sites and Ranges. Area 45, Parcel 232Q-X is in the northern portion of the study area. Area 45 extends from the western boundary of the Main Post across Iron Mountain Road and to just west of 13th Avenue. Area 45 is oriented east to west and includes areas just south of Summerall Gate Road, north of Iron Mountain, east of the western Main Post boundary, and west of Motor Pool Area 3100 located on 13th Avenue. The study area for Area 45 west of Iron Mountain Road is mostly along the north slope of Sunset Hill. Drainage of this area is primarily to the north through intermittent tributaries connecting to Remount Creek, which flows north along the east side of Iron Mountain Road.

Several former ranges and other sites are located within Area 45, but are excluded from this study area because they are being investigated under separate work plans. The following sites and ranges within Area 45 are excluded from this study area:

- Area M2, Subsection of Area 45
- Parcel 69Q, The Skeet Range
- Parcel 75Q, Range 19, Qualification Pistol Range
- Parcel 122(7), Former Fog Oil Storage Area
- Parcel 221Q-X, Former Rifle Grenade Range North of Washington Ranges
- Parcel 233(7), Fill Area West of Range 19.

The sites and ranges within or bordered by Area 45, Parcel 232Q-X that will be investigated include the following:

- Parcel 181(7), Training Area T-4: Former Biological Simulant Test Area
- Parcel 194(7), Former Weapons Demonstration Area
- Parcel 518(7), South Gate Toxic Gas Yard
- Parcel 73Q-X, Range 17, Explosives Proficiency Training Area
- Parcel 228Q, Former Machine Gun Transition Range
- Parcel 229Q-X, Former Rocket Launcher Range.

The South Gate Toxic Gas Yard, Parcel 518(7), is referenced (by text only) on the 1956 map of Chemical Corps Training Areas. The exact location is unknown, but was probably near or within the Former Chemical Weapons Demonstration Area, Parcel 194(7).

Ranges South of the Area 45 Ranges. There are 12 ranges south of the Area 45 ranges, west of Iron Mountain Road, including:

- Parcel 91Q-X, Dud Impact Area
- Parcel 114Q-X, Former Large Caliber Weapons Range
- Parcel 115Q, Former Small Arms Range
- Parcel 116Q-X, 60mm Mortar Range
- Parcel 117Q-X, Main Post Impact Area
- Parcel 129Q-X, Former Mock Vietnam Village
- Parcel 151Q, Former Rifle Range
- Parcel 200Q, Former Rifle Range
- Parcel 201Q, Former Rifle Range
- Parcel 231Q, Former Range O.Q.-2A
- Washington Tank Range
- 1950 Rocket Launcher Range.

The area south of Iron Mountain and west of Ranges 12 and 13, as shown on Plate 10 of the 1999 USACE *Archives Search Report*, contains two ranges that are not matched to the ranges listed as parcels in the environmental baseline survey; Washington Tank Range and 1950 Rocket Launcher Range. There is insufficient detail on Figure 10 of the USACE 1999 *Archive Search Report, Maps* to match the two range locations well with environmental baseline survey range parcels. These ranges overlap with other ranges and are orientated toward the east.

As part of the SI, IT will collect 101 surface soil samples, 101 subsurface soil samples, 76 groundwater samples, 22 surface water samples, and 22 sediment samples at these sites. Potential contaminant sources at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range are primarily unknown, but may include lead, nitroexplosives, tear gas, flares, napalm, white phosphorus, molasses residue, field flame expedient, supertropical bleach, Decontamination Solution Number 2, and practice smoke grenades. The samples collected for Parcels 181(7) and 194(7) will be analyzed for volatile organic compounds, semivolatile organic compounds, nitroexplosives, metals, and perchlorate. Samples collected at the remaining ranges will be analyzed for metals, nitroexplosives, and perchlorate. All groundwater samples will be analyzed for volatile organic compounds. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared to site-specific screening levels and ecological screening values presented in the IT 2000 *Final Human Health and*

Ecological Screening Values and PAH Background Summary Report, and regulatory agency guidelines.

Several of the Ranges West of Iron Mountain Road fall within the "Possible Explosive Ordnance Impact Areas" shown on Plate 10 of the USACE 1999 *Archives Search Report, Maps*; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Ranges West of Iron Mountain Road. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range will be used in conjunction with the site-specific safety and health plan (SSHP), the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide SHP, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the SSHP and site-specific UXO safety plan.

1.0 Project Description

1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, under Task Orders CK04 and CK10, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000) for FTMC has been prepared to provide technical guidance for sample collection and analysis at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and the site-specific unexploded ordnance (UXO) safety plan developed for the Ranges West of Iron Mountain Road and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP and the site-specific UXO safety plan attachments.

1.2 Site Description

The Ranges West of Iron Mountain Road that comprise this study area include the following sites and ranges (Figures 1-1 and 1-2):

- Parcel 181(7), Training Area T-4: Former Biological Simulant Test Area
- Parcel 194(7), Former Weapons Demonstration Area
- Parcel 518(7), South Gate Toxic Gas Yard
- Parcel 73Q-X, Range 17, Explosives Proficiency Training Area
- Parcel 91Q-X, Dud Impact Area
- Parcel 114Q-X, Former Large Caliber Weapons Range
- Parcel 115Q, Former Small Arms Range
- Parcel 116Q-X, 60mm Mortar Range
- Parcel 117Q-X, Main Post Impact Area

- Parcel 129Q-X, Former Mock Vietnam Village
- Parcel 151Q, Former Rifle Range
- Parcel 200Q, Former Rifle Range
- Parcel 201Q, Former Rifle Range
- Parcel 228Q, Former Machine Gun Transition Range
- Parcel 229Q-X, Former Rocket Launcher Range
- Parcel 231Q, Former Range O.Q.-2A
- Parcel 232Q-X, Area 45
- Washington Tank Range
- 1950 Rocket Launcher Range.

The Ranges West of Iron Mountain Road include the area in the western portion of the Main Post from Summerall Gate Road south to Yahoo Lake and west to just north of Blue Mountain (Figure 1-3). The east-west limits of the area are from the western boundary of the Main Post, east to Iron Mountain Road, north of Yahoo Lake. However, Parcel 232Q-X extends to the east side of Iron Mountain Road in the northern section of the study area (Figure 1-3).

Several of the ranges included in this study area have safety fans that exceed the likely impact areas based on the type of munitions reportedly used at each range. These safety fans cover an extremely large area that is not representative of the actual impact areas. The SIs will focus sample locations in the areas of the likely firing lines and the probable impact areas of each range, if they can be determined. Sample locations will not be proposed over the entire safety fans. Because of the number of ranges and the subsequent overlapping of ranges in this study area, impact areas will not be linked to specific firing lines.

The investigation will not extend beyond of the current Main Post boundary, although some of the parcels have firing lines and areas indicated outside the current western Main Post boundary. The ranges at Parcels 200Q and 228Q and possibly other ranges in this study area have probable impact areas that are on the east side of Iron Mountain Road. The probable impact areas of these ranges overlap other former ranges located on the east side of Iron Mountain Road. The probable impact areas for Parcels 200Q and 228Q will be investigated with the ranges located east of Iron Mountain Road. Therefore, with the exception of Parcel 232Q-X in the northern part of the study area, the study area for this SI will not extend east beyond Iron Mountain Road.

Figure 1-3 presents the study area for the Ranges West of Iron Mountain Road with probable UXO impact areas derived from several sources. The larger impact areas (shown by red and blue

polygons) indicate probable UXO impact areas based on high density areas (within red polygons) and medium density areas (within blue polygons) that were developed through records review and field reconnaissance conducted by Foster Wheeler Environmental Corporation (Foster-Wheeler) (Foster-Wheeler, 2000). The smaller brown polygons labeled with letters are estimated areas of impact based on the density of ordnance located by explosive ordnance disposal (EOD) Technology, Inc. surveys for the areas within the eastern bypass right-of-way. The other brown polygons with numerals represent areas with notable physical characteristics (e.g., trenches, depressions, mounds, berms, etc.) observed by IT field personnel during July 2000. IT personnel were unable to walk some of the areas due to access restrictions because of ongoing UXO remediation in the area of the eastern bypass right-of-way. This included a large area in the center of Parcel 232Q-X from the eastern edge of Parcel 181(7) east to Iron Mountain Road and from Summerall Gate Road south to just south of Iron Mountain and Parcel 91Q-X.

The elevation in this area ranges from about 790 feet above mean sea level (msl) in Parcel 232Q-X, near Area M2, to 1,270 feet at the top of Iron Mountain in the central-eastern portion of the study area (Figure 1-3). The highest elevation of the study area is a ridge along the western side of Iron Mountain Road. This ridge, which runs primarily north and south, slopes to the west and northwest, and connects Iron Mountain and Wheeler Hill. This ridge appears to have been a backstop to most of the ranges in this study area. The orientation of most of the ranges are northwest to southeast or west to east and appear to use Iron Mountain, Wheeler Hill, and connecting ridges as backstops. However, one range in the study area, Parcel 229Q-X, Former Rocket Launcher Range, is oriented northeast to southwest.

Iron Mountain, at 1,270 feet msl, and Wheeler Hill, at about 1,260 feet msl, are the tallest mountains within the central-eastern and southeastern areas of the Ranges West of Iron Mountain Road (Figure 1-3). Three mountains comprise the southern limit to the Ranges West of Iron Mountain Road including, west to east, Blue Mountain (1,516 feet msl), Reynolds Hill (1,378 feet msl), and Cable Hill (about 1,240 feet msl). The intermittent streams that drain the study area flow primarily to the northwest.

The following sections provide information of the individual sites comprising the Ranges West of Iron Mountain Road that are included in the investigation (Figure 1-3). The descriptions of the parcels include available historical information about each site as well as general figures showing the ranges and the extent of the safety fans.

1.2.1 Area 45, Parcel 232Q-X and Adjacent Sites and Ranges

Area 45, Parcel 232Q-X, is in the northern portion of the study area. Area 45 extends from the western boundary of the Main Post across Iron Mountain Road and to just west of 13th Avenue. Area 45 is oriented east-west and includes areas just south of Summerall Gate Road, north of Iron Mountain, east of the western Main Post boundary, and west of the Motor Pool Area 3100 located on 13th Avenue (Figures 1-3 and 1-4). The study area for Area 45 east of Iron Mountain Road is mostly along the north slope of Sunset Hill. Drainage of this area is primarily to the north and through intermittent tributaries connecting to Remount Creek that flows north along the east side of Iron Mountain Road.

The central portion of Area 45, Parcel 232Q-X, along both sides of Iron Mountain Road and continuing to the south, was known as Combat Range No. 2 (USACE, 1999a). Built during the inter-war period, the initial use of the combat range is unknown. During World War II, Combat Range No. 2 was divided into other ranges including a rocket range, a machine gun range, and two rifle grenade ranges. By 1958, all ranges in this area were closed or abandoned.

The sites and ranges within or bordered by Area 45, Parcel 232Q-X, include the following:

- Parcel 181(7), Training Area T-4: Former Biological Simulant Test Area
- Parcel 194(7), Former Weapons Demonstration Area
- Parcel 518(7), South Gate Toxic Gas Yard
- Parcel 73Q-X, Range 17, Explosives Proficiency Training Area
- Parcel 228Q, Former Machine Gun Transition Range
- Parcel 229Q-X, Former Rocket Launcher Range.

Several former ranges and other sites are located within Area 45, but some are excluded from this SI because they are being investigated under separate work plans. However, existing samples collected at some of these areas are referenced in Chapter 4.0 because of the proximity of the sample locations to areas of concern within the Ranges West of Iron Mountain Road. The sites and ranges within Area 45 excluded from this SI include the following (Figure 1-4):

- Area M2, Subsection of Area 45
- Parcel 69Q, The Skeet Range
- Parcel 122(7), Former Fog Oil Storage Area
- Parcel 221Q-X, Former Rifle Grenade Range North of Washington Ranges
- Parcel 233(7), Fill Area West of Range 19.

Training Area T-4. Training Area T-4, Parcel 181(7), is located in the western part of the Main Post, south of Summerall Gate Road, near the western Main Post border (Figure 1-5). The area, which covers approximately 0.25 acre, was in use from 1965 to 1971 and is not fenced. Surface topography at the site ranges from 860 feet above msl to approximately 880 feet above msl and slopes to the north toward Summerall Gate Road and to the west toward the western Main Post boundary. A 1973 U.S. Army photograph of Training Area T-4 shows a circular disturbed area centrally marked by a concrete monument (Science Applications International Corporation [SAIC], 1999). Similar concrete markers at FTMC have been associated with former training site locations and/or burial sites.

During the October 1991 site visit by U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) and SAIC, the area of the former site identified by the Base had been extensively reworked and there was not any evidence of a former site observed at the location (SAIC, 1993). In May 1998, USACE-St. Louis Engineer district personnel walked the identified area for Training Area T-4 and did not find any evidence of the previous training activities (USACE, 1999a). There was not any surface contamination observed or burial area found (USACE, 1999a).

Biological simulants, Bacillus globigii (BG), a persistent spore-forming organism, and Serratia marcescens (SM), a nonpersistent spore-forming organism, were used at Training Area T-4 (Environmental Sciences and Engineering, Inc. [ESE], 1998). Both biological simulants are naturally occurring and the organisms are believed to be generally harmless when used with prescribed safety precautions. These biological simulants were used in relatively small amounts in individual exercises. It is believed that any disseminated biological materials that may have escaped decontamination procedures would have been destroyed by natural processes (ESE, 1998). Other materials formerly used at this site consisted of the decontamination agents supertropical bleach (STB) and Decontamination Solution Number 2 (DS2) (ESE, 1998).

Surface soils were reportedly decontaminated using STB and DS2. It was reported that Training Areas T-4 or T-5 may have been the site of a 110-gallon distilled mustard (HD) spill, which reportedly occurred in 1955 (ESE, 1998). None of the personnel interviewed during the environmental baseline survey (EBS) site visit could recall a 110-gallon spill, nor could they imagine a scenario during which a spill of this magnitude could occur; however, the HD

E 662,400

E 662,900

N 1,165,100

N 1,164,800

PARCEL 181(7)

825

850

875

900

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK

OBSERVATION BY IT CORP, JULY 2000
PIT/DEPRESSION SIZE:

1 — 2-5' DIAMETER x ≤ 2' DEEP
2 — 5-10' DIAMETER x 3-5' DEEP
3 — ≥ 10' DIAMETER x ≥ 5' DEEP

SCALE
0 50 100 FEET

FIGURE 1-5
SITE MAP
TRAINING AREA T-4
PARCEL 181(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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STARTING DATE: 05/22/00 DATE LAST REV.:
DRAWN BY: D. BILLINGSLEY DRAWN BY:
PROJ. MGR.: J. YACOUB DRAFT. CHCK. BY:
INITIATOR: J. RAGSDALE ENGR. CHCK. BY: J. RAGSDALE
DWG. NO.: ...\796887es.081
PROJ. NO.: 796887

simulant, molasses residue (MR), was delivered in 55-gallon drums. Analyses of surface soil samples collected in April and July 1973 did not detect HD contamination. The area is authorized for surface use only by USATHAMA and the FTMC U.S. Army Chemical School (ESE, 1998).

Site investigations conducted during the remedial investigation (RI) included field screening for the chemical warfare materials (CWM) HD and nerve agent (VX) and their breakdown products, soil sampling, and magnetometer surveying over a site identified in historical records and site photography (SAIC, 1995). Surface evidence of the former training area was not observed during the RI. Four shallow soil samples were collected and screened in the field for the presence of HD and VX, and then sent to the laboratory for determination of the presence of HD and VX breakdown products. HD, VX, and their breakdown products were not detected in these four samples or in surface soil samples collected from this area in 1973 (SAIC, 1993). Samples were not analyzed for biological simulants. The geophysical survey indicated metallic debris scattered within and beyond the site boundaries and burial of some items is suggested by the geophysical data (SAIC, 1995).

Several large pits/depressions were observed during a site walk by IT personnel in July 2000 (Figure 1-5). Pits/depressions, some over 10 feet in diameter and greater than 5 feet deep, were observed around the northwest and southwest corners of the parcel.

Former Weapons Demonstration Area, Parcel 194(7). The Former Weapons Demonstration Area is located southeast of Summerall Gate Road on the western portion of the Main Post within Area 45 (Figure 1-6). The Former Weapons Demonstration Area, Parcel 194(7), was reportedly located at the top of the hill at the first road east of the post gate (ESE, 1998). This area is shown on the 1954 and 1961 aerial photographs and is referenced on the 1956 map of Chemical Corps Training Areas (USACE, 1999a). The site was reportedly used in the 1950s for familiarization training with various munitions. Munitions demonstrated include white phosphorus grenades, flame-throwers, white phosphorus, and field flame expedient (FFE) (ESE, 1998). This area appears cleared and the site of intense activity on aerial photographs taken in 1957. The site currently has unrestricted access.

According to the Archives Search Report (ASR), the Former Chemical (Weapons) Demonstration Area in 1954 was located about a mile and a half west of the Chemical School on Summerall Road, near the Summerall Gate Road entrance to FTMC (then called South Gate

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- OBSERVATION BY IT CORP, JULY 2000 PIT/DEPRESSION SIZE:
- 1 — 2-5' DIAMETER x ≤ 2' DEEP
- 4 — SMOKE GRENADES/FLARE PIECES

FIGURE 1-6
SITE MAP
FORMER WEAPONS DEMONSTRATION AREA
PARCEL 194(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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ENGR. CHCK. BY: J. RAGSDALE
INITIATOR: J. RAGSDALE
PROJ. MGR.: J. YACOUB
DRAWN BY: D. BILLINGSLEY
STARTING DATE: 05/22/00
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Road) (USACE, 1999a). The area included a toxic gas yard, a radiological survey area, and a biological warfare (BW) survey area. An interview with a retired chemical school instructor also makes reference to this area (USACE, 1999a). The interviewee stated that the "Weapons Demonstration Area" could be found by taking the first right after entering Summerall Gate and going to the top of the hill (ESE, 1998).

During the interviewee's tenure, toxic chemical agents were not used at this location (USACE, 1999a). A second interviewee, who had conducted training at the site, stated that area was in use when he came to FTMC in 1961 and was used through 1963. He also stated that the area was never used for live agent training during his tenure (USACE, 1999a). Both interviewees stated that the area was used for simulated detection of biological agent, however agent was not employed, the trainees simply went through the motions (USACE, 1999a).

Munitions demonstrated in this area included the following (USACE, 1999a):

- Mechanical flame thrower
- Portable flame thrower
- Various smoke grenades
- Rifle smoke grenades
- Thermite grenades
- X-200 land mines (napalm-filled 5-gallon can)
- M5 and M4A2 (Navy floating) smoke pots
- M2 and M3 smoke generators
- Primacord
- M1 land mine filled with MR (innocuous simulant for HD)
- White phosphorus
- FFE.

By 1955, the Chemical Demonstration Area (Former Weapons Demonstration Area) was deemed inadequate with regard to proper safety distances for parts of the chemical munitions demonstrations (USACE, 1999a). Officials cited several reasons for their concern over the demonstration area including:

- In the demonstration of chemical rifle grenades, it was found that grenades had landed occasionally on the shoulders of South Gate Road (Summerall Gate Road), even though fired at the appropriate angle and as far back from the road as possible.

- During the demonstration of the 55-gallon drum of napalm, fragments of the drum had landed on the edge of South Gate Road.

In addition, the safety distance for the chemical manifold, and the wind conditions in the area for the mechanized flame thrower proved to be inadequate. A recommendation for a new demonstration area included Washington Rocket Launcher Range No. 16 and Washington Rifle Grenade Range No. 17.

During May 1998, personnel from the USACE-St. Louis Engineer District inspected many areas suspected of being used for chemical warfare training or CWM storage. The area south of Summerall Gate Road and east of the entrance gate was walked. The nose of a concrete bomb was found sticking out of the ground in a small open area. The concrete bomb nose was sticking straight up and may have been used as some sort of marker. A small metal can was found about 20 feet from the concrete bomb. The can resembled the type used to ship fuses and boosters for various types of ordnance. There were not any other indications found of surface contamination or burial sites (USACE, 1999a). Also, there is not any documented evidence of toxic agents being used in this area (USACE, 1999a).

Several small pits/depressions and some spent smoke grenade/flare pieces were observed during a site walk by IT personnel in July 2000 (Figure 1-6). Pits/depressions measuring 2 to 5 feet in diameter and less than 2 feet deep were observed along the eastern side of the parcel. In two locations, spent smoke grenade and flare pieces were observed in the area as well. A high concentration of relatively small depressions indicating potential impact areas were observed approximately 500 to 800 feet east of Parcel 194(7) (Figure 1-3).

South Gate Toxic Yard, Parcel 518(7). This area, reported within Area 45, is referenced only by text on the 1956 map of Chemical Corps Training Areas (USACE, 1999a). The area is cited as being 1.5 miles west of the school. The exact location of the South Gate Toxic Yard and the items stored at the yard are unknown. However, this area was probably near or within the Former Weapons Demonstration Area (USACE, 1999a).

Range 17, Explosives Proficiency Training Area, Parcel 73Q-X. Range 17, Explosives Proficiency Training Area, Parcel 73Q-X, is located in the southwestern portion of the Main Post, south of Summerall Gate Road near the intersection with Iron Mountain Road (Figure 1-7).

The range was used from 1977 through mid-1994. Range 17 was most recently used as a communications training area. Records from 1983 indicate that Range 17 was used as an explosives and ordnance disposal training range and impact area at that time. FTMC training maps indicate that a Dud Impact Area (Parcel 91Q-X) is located a short distance south of Range 17. Additional information regarding this range, dates of use, or operation is not available.

IT personnel were unable to conduct a site walk in this area due to ongoing UXO remediation by EOD Technology, Inc., within the eastern bypass right-of-way.

Former Machine Gun Transition Range, Parcel 228Q. Former Machine Gun Transition Range, Parcel 228Q, is located northeast of Range 17, Explosives Proficiency Training Area, Parcel 73Q-X, and extends to the southeast (Figure 1-8). The 1946 Reservation Map (U.S. Engineer Office, 1946) identifies a range designated "M.G.T." at Range 17. It is believed that this is a "machine gun transition" range (ESE, 1998). The range is part of Combat Range No. 2. The direction of fire at this range was to the southeast toward the north slope of Baltzell Hills east of Iron Mountain Road. The 1946 Reservation Map is the only documentation of this range. There is not any other information that is available regarding this range, dates of use, or operation.

IT personnel were unable to conduct a site walk in this area due to ongoing UXO remediation by EOD Technology, Inc. within the eastern bypass right-of-way.

Former Rocket Launcher Range, Parcel 229Q-X. The Former Rocket Launcher Range, Parcel 229Q-X, extends to the southwest across Range 17, Explosives Proficiency Training Area, Parcel 73Q-X (Figure 1-9). The 1946 Reservation Map (U.S. Engineer Office, 1946) identifies a "Rocket Launcher Range" in the vicinity of Range 17 (ESE, 1998). Whereas the direction fire at Range 17 was to the south, the direction of fire at this range was to the southwest. The impact area is not identified and only a portion of the safe distance zone (SDZ) is identified on the 1946 map. The direction of fire was generally in the direction of a hill, presumably Iron Mountain. There is some discrepancy between the precise location of Iron Mountain, as plotted on current topographic maps, and the 1946 Reservation Map (ESE, 1998). The SDZ plotted on the EBS maps is estimated from the partial SDZ presented on the 1946 map and knowledge of maximum range for this ordnance (ESE, 1998). The 1946 Reservation Map is the only documentation of

this range. Additional information regarding this range, dates of use, or operation is not available.

IT personnel were unable to conduct a site walk in this area due to ongoing UXO remediation by EOD Technology, Inc., within the eastern bypass right-of-way.

1.2.2 Ranges South of the Area 45 Ranges

There are 12 ranges south of the Area 45 ranges and west of Iron Mountain Road, and includes the following ranges (Figure 1-10):

- Parcel 91Q-X, Dud Impact Area
- Parcel 114Q-X, Former Large Caliber Weapons Range
- Parcel 115Q, Former Small Arms Range
- Parcel 116Q-X, 60mm Mortar Range
- Parcel 117Q-X, Main Post Impact Area
- Parcel 129Q-X, Former Mock Vietnam Village
- Parcel 151Q, Former Rifle Range
- Parcel 200Q, Former Rifle Range
- Parcel 201Q, Former Rifle Range
- Parcel 231Q, Former Range O.Q.-2A
- Washington Tank Range
- 1950 Rocket Launcher Range.

Dud Impact Area, Parcel 91Q-X. FTMC training maps indicate that a Dud Impact Area, Parcel 91Q-X, is located a short distance south of Range 17, Explosives Proficiency Training Area, Parcel 73Q-X (Figure 1-11). This Dud Impact Area was observed during the EBS site visit and is considered a permanently dudded area (ESE, 1998). One EOD disposal pit and numerous ordnance items were observed during the EBS site visit. The majority of the ordnance items were identified by members of the 142nd EOD, stationed at FTMC, as being fragments of 2.36-inch bazooka rounds. One of these rounds appeared to contain explosives in the warhead (ESE, 1998).

IT personnel were unable to conduct a site walk in this area due to ongoing UXO remediation by EOD Technology, Inc., within the eastern bypass right-of-way.

Former Large Caliber Weapons Range, Parcel 114Q-X. This former range is located west of Iron Mountain Road (Figure 1-12). Ordnance fired at this range included unspecified

large and small caliber weapons (ESE, 1998). Dates of use are unknown, but this site appears on 1957 aerial photos and a 1959 map. This range is identified on the 1959 map as a rifle range; however, 1957 aerial photographs display what appear to be hard targets arranged identically to those at one of the tank ranges at the northern Main Post boundary (ESE, 1998).

Observations during a site walk by IT personnel in July 2000 revealed physical features of primarily a small arms range in the area of Parcel 114Q-X. The range was oriented to the east, but the probable firing line was not obvious which is shown, in the EBS, partly outside the western FTMC boundary. It appeared some trenching had occurred just east of the probable firing line and the perimeter road along the western FTMC boundary fence. Small trenches and firing points were observed to the east and uphill at approximately 400 to 500 feet from the probable firing point (Figure 1-3). Further east and uphill, wood-framed target pits (approximately 7 to 8 feet deep) and perpendicular trenches were observed. Throughout the central and southern area of Parcel 114Q-X, small arms fragments were observed.

Former Small Arms Range, Parcel 115Q. Former Small Arms Range, Parcel 115Q, is a former small arms range located west of Iron Mountain Road near the western border of the Main Post (Figure 1-13). Documentation of this range is limited to aerial photographs from 1957 (ESE, 1998). The range appears to be constructed in a manner similar to Range 12 (short pistol range). Additional information describing this range and the activities conducted at the range was not available.

Observations by IT personnel during a site walk in July 2000 at Parcel 115Q revealed physical features of a short, small arms range. It appeared to have a probable firing line at the north end and three small berms (4 to 5 feet high) to the south that were likely backstops behind targets. The berms appeared somewhat eroded and overgrown with trees. The site has a small intermittent stream that flows to the west between the firing line and the first berm. A dirt road separates the middle and the southern most berm. The range appeared to have been abandoned for a long time.

60-Millimeter Mortar Range, Parcel 116Q-X. The 1946 Reservation Map (U.S. Engineer Office, 1946) identifies a 60-millimeter mortar range near the post boundary south of Summerall Gate (ESE, 1998) (Figure 1-14). The direction of fire was to the northeast in the general

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ENGR. CHCK. BY: J. RAGSDALE
INITIATOR: J. RAGSDALE
PROJ. MGR.: J. YACOUB
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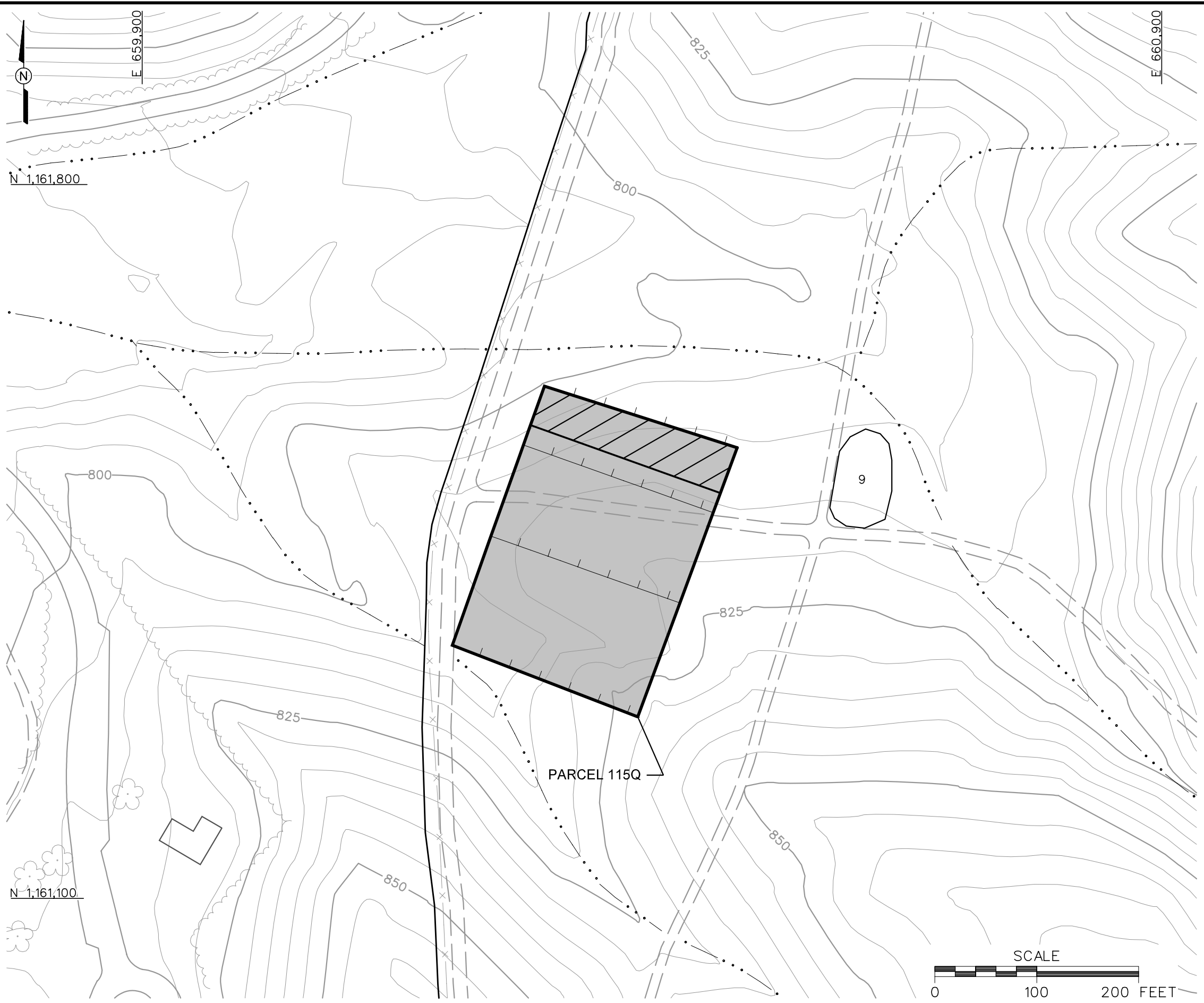

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- FENCE
- BERM
- PROBABLE FIRING LINE AREA
- OBSERVATION BY IT CORP, JULY 2000:
  - 9 — AREA CONTAINS 15-20 SMALL TRENCHES, 5-6' LONG AND 1-2' DEEP, LINED UP NORTH-SOUTH

SCALE
0 100 200 FEET

FIGURE 1-13
SITE MAP
FORMER SMALL ARMS RANGE
PARCEL 115Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

direction of the western and northern slopes of Iron Mountain. Only a portion of the SDZ is identified. The firing line was also identified on 1959 maps (ESE, 1998).

According to the ASR, a 60-millimeter mortar range appears to have been first used in this area during World War II (USACE, 1999a). This mortar range was abandoned sometime between 1958 and 1967. During the site visit to collect information for the ASR, remnants of 60-millimeter high explosive (HE) mortar rounds were found in Area 15 (USACE, 1999a).

The SDZ plotted on the EBS maps is estimated from the partial SDZ presented on the 1946 Reservation Map and knowledge of the maximum range for this ordnance (ESE, 1998). The impact area was not identified on this map; however, aerial photographs taken in 1961 display a ridge off the northwest flank of Wheeler Mountain, which was largely cleared of vegetation. This ridge is possibly the impact area for some of the ordnance fired from this mortar range. Additional information regarding this range, dates of use, or operation was not available (ESE, 1998).

A large trench, 8 to 10 feet deep, was observed in the area of the probable firing line area for Parcel 116Q-X during a site walk by IT personnel in July 2000. This trench is the likely firing point for the 60-millimeter Mortar Range, Parcel 116Q-X. Several physical features were noted indicating probable impact areas on west and northwest slopes between Iron Mountain and Wheeler Hill. On a northwestern slope, east and northeast of Wheeler Hill, several 60-millimeter mortar fragments were observed with areas of small shallow depressions. It appeared to be the area described from the 1961 aerial photograph, above. Another area on a ridge approximately 1,200 feet northeast of the probable firing line for the Parcel 116Q-X contains several large trenches. One of these trenches is over 50 feet long and 6 to 8 feet deep. Additional areas further north and northeast reveal small arms and smoke grenade/flare fragments as well as a few metal targets with bullet holes.

Impact Area, Parcel 117Q-X. Impact Area, Parcel 117Q-X, is located near the southwest boundary of the Main Post and includes part of the current area known as Lagarde Park, which is outside of the FTMC boundary (Figure 1-15). The mapped boundary of Impact Area, Parcel 117Q-X, is based on information compiled in an informal document maintained by FTMC legal staff and from impact areas identified by the Environmental Photographic Interpretation Center (EPIC) (ESE, 1998). The impact area identified by EPIC for Impact Area, Parcel 117Q-X, is

within the vicinity of mortar ranges and other previously identified large caliber ranges; however, no direct information is available regarding the weapons which impacted any of these sites. Impact Area, Parcel 117Q-X, is located at the southwestern Post boundary and contained a variety of ordnance materials, including mines. UXO clearance had been conducted at the portion of this impact area now occupied by part of the Lagarde Park, which is owned by the City of Anniston. Lagarde Park contains a community center swimming pool, tennis courts, and a natural history museum (ESE, 1998).

As shown on Figure 1-10, several ranges (Parcels 91Q-X, 114Q-X, 115Q, 116Q-X, 129Q-X, 151Q, 200Q, 201Q, and 231Q) overlap Parcel 117Q-X. The area observations noted by IT personnel during the site walk in July 2000 have been described in the sections for the overlapping ranges listed above (Figure 1-3).

Former Mock Vietnam Village, Parcel 129Q-X. A Former Mock Vietnam Village was constructed in approximately 1968 on the southwestern Main Post, and was used for training exercises until approximately 1971 (ESE, 1998). The village was located mostly on land currently occupied by Lagarde Park (Figure 1-16). Remnants of the Former Mock Vietnam Village are located in a wooded area approximately 75 feet north of the community center swimming pool and tennis courts (ESE, 1998). The former training site contained at least two buildings and had the perimeter marked with barbed wire. Two pits were dug on the site, the larger being about 8 feet in diameter and at least 4 feet deep (ESE, 1998). Ordnance observed by USACE)- St. Louis District personnel in the vicinity of the Former Mock Vietnam Village included detonators for booby traps, practice smoke grenades, one grenade, and flares. A large amount of ortho-chlorobenzylidene-malononitrile (CS) tear gas was also used in training at this location (ESE, 1998).

Former Rifle Range, Parcel 151Q. Evidence of a former rifle range located west of current Range 13 is limited to aerial photographs from 1957 (ESE, 1998) (Figure 1-17). There is not any other information available (ESE, 1998).

Observations by IT personnel during a site walk in July 2000 in the area of Parcel 151Q revealed physical features of primarily a small arms range in the area of Parcel 151Q. However, it appeared that the range area was also used in part for a 60-millimeter mortar impact based on the 60-millimeter mortar fragments found in the area. The range was oriented to the east, but the

probable firing line was not obvious. Small trenches and firing points were observed to the east and uphill of the probable firing line (Figure 1-3). Throughout the area east and north of Parcel 151Q, small arms fragments were observed. A series of 15 to 20 small trenches or possible fighting positions were observed west of Parcel 151Q and next to the intersection of two dirt roads. These trenches were aligned east to west and were 5 to 6 feet long and 1 to 2 feet deep. The trenches were in a side by side line, north to south.

Former Landscape Range, Parcel 200Q. The Former Landscape Range, Parcel 200Q, is shown on Figure 1-18. Parcel 200Q is listed in Table 6.02 of the EBS as Former Landscape Range (Washington Range), but Section 5.1.10.11 of the EBS lists the range with Former Rifle Ranges (110Q, 111Q, 149Q, 150Q, 200Q, 201Q) without any discussion (ESE, 1998). It appears from the ASR that Parcel 200Q is Old Range 12 that was built during World War II as a Landscape Range (USACE, 1999a). The range also included Field Firing Points 1 and 2. By 1958, it is listed as Range 12, Rifle Field Firing. The range was abandoned by 1967. However, current Range 12 is the Competitive Pistol Range, Parcel 70Q, and is east of Iron Mountain Road. Parcel 70Q is not included in this investigation.

IT personnel were unable to conduct a site walk in the area of Parcel 200Q due to ongoing UXO remediation by EOD Technology, Inc. within the eastern bypass right-of-way.

Former Rifle Range, Parcel 201Q. Parcel 201Q is the site of the Field Firing Range in a 1948 historical map; and two rifle ranges in 1946 (Field Firing Ranges No. 1 and 2) (ESE, 1998) (Figure 1-19). These ranges were combined into a single parcel in the EBS.

As shown on Figure 1-10, several ranges (Parcels 114Q-X, 115Q, 116Q-X, 129Q-X, 151Q, 200Q, 201Q and 231Q) overlap Parcel 201Q. The range observations noted by IT personnel during the site walk in July 2000 have been described in the sections for the overlapping ranges listed above (Figure 1-3).

Former Range O.Q.-2A, Parcel 231Q. The 1946 Reservation Map (U.S. Engineer Office, 1946) identifies a range designated O.Q.-2A near the post boundary south of Summerall Gate (ESE, 1998) (Figure 1-20). The direction of fire was almost due east. The 1946 Reservation Map is the only documentation of this range. Additional information regarding this range, dates

of use, or operation was not available (ESE, 1998). Also, there is no indication why this range is named as it is.

As shown on Figure 1-10, two ranges (Parcels 116Q-X and 117Q-X) overlap Parcel 201Q. The range observations noted by IT personnel during the site walk in July 2000 have been described in the sections for the overlapping ranges listed above.

Archive Search Report Identified Ranges. The area south of Iron Mountain and west of Ranges 12 and 13 (Parcels 70Q and 71Q, respectively) as shown on Plate 10 of the ASR show two ranges that are not easily matched to the ranges listed as parcels in the EBS (USACE, 1999a) (Figures 1-3 and 1-21). These ranges are shown as the Washington Tank Range and 1950 Rocket Launcher Range. There is insufficient detail on Figure 10 of the ASR to match the two range locations with EBS range parcels. These ranges overlap and the orientation is easterly. The following are the descriptions of the two ranges listed in the ASR, not included in discussions above.

Washington Tank Range. This tank range first appears on the 1958 Range Map and is listed as Tank, Tables 1, 2, and 3. The range was abandoned by 1967 (USACE, 1999a) (Figure 1-21). Use of the range is unknown, but it may have been associated with the reserve units located on Highway 21. The range orientation is to the east.

Several ranges (Parcels 114Q-X, 115Q, 116Q-X, 151Q, 200Q, 201Q, and 231Q) overlap the Washington Tank Range. The range observations, noted by IT personnel during the site walk in July 2000, have been described in the sections for the overlapping ranges listed above (Figure 1-3).

1950 Rocket Launcher Range. The 1950 Range Map shows a 2.36-inch rocket launcher range north of the 60-millimeter mortar range (USACE, 1999a) (Figure 1-21). The range was abandoned sometime before 1958. This range does not appear to be the same as Former Rocket Launcher Range, Parcel 229Q-X, because the locations and orientations are different. The two range locations are separated by almost a mile. The orientation of the 1950 Rocket Launcher Range, as shown on Plate 10 of the ASR, is to the east, southeast and Former Rocket Launcher Range, Parcel 229Q-X, orientation is to the south.

Several ranges (Parcels 114Q-X, 115Q, 116Q-X, 151Q, 200Q, 201Q, and 231Q) overlap the 1950 Rocket Launcher Range. The range observations, noted by IT personnel during the site walk in July 2000, have been described in the sections for the overlapping ranges listed above (Figure 1-3).

1.2.3 Soil Descriptions

Soils at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, consist of primarily three soil series. These are as follows:

- The stony rough land series of soils
- The Anniston and Allen Series of soils
- The Philo and Stendal Series of soils.

The soils of the higher elevations of Iron Mountain, Wheeler Hill, Blue Mountain, Reynolds Hill and Cable Hill consist of the stony rough land, sandstone (Ss) series (U.S. Department of Agriculture [USDA], 1961). This miscellaneous land type consists of rough mountainous area with many outcrops of sandstone and quartzite bedrock, loose rock fragments, and scattered patches of sandy soil material. It also includes rock escarpments on higher parts of the mountains where quartzite of the Weisner Formation is common. Slopes are generally more than 25 percent. The soil material is generally shallow over bedrock. Depth to bedrock is typically less than 3 feet. Depth to groundwater is usually more than 20 feet.

Next lower in elevation is the Anniston and Allen Series of soils. The Anniston and Allen Series consist of four mapping units depending on the slope of the terrain in the area. These mapping units are as follows:

- Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded (AcB2)
- Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2)
- Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded (AcD2)
- Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded (AcE2).

The Anniston and Allen Series of soils consist of strongly acid, deep well drained soils that have developed in old local aluvium. The parent material washed from the adjacent higher lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone,

shale, and quartzite. The surface sandstone and quartzite gravel and cobbles, as much as 8 inches in diameter, are on the surface and throughout the soil. The depth to bedrock at these sites ranges from 2 feet to greater than 10 feet. The depth to the water table is likely greater than 20 feet. The typical soil description is 2 to 10 feet of well-drained stony loam to clay loam over stratified local alluvium, limestone or shale bedrock. Shallow groundwater direction at the site is likely controlled by topography.

This mapping unit consists of friable soils that have developed in old alluvium on foot slopes and along the base of mountains. The color of the surface soil ranges from very dark brown and dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low.

Soils that fall into the Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded (AcB2) consist of friable soils that have developed in old alluvium on foot slopes and along the base of mountains (USDA, 1961). The color of the surface soil ranges from very dark brown and dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 feet to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low.

Soils that fall into the Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2) consist of friable soils that have developed in old alluvium on foot slopes and along the base of mountains (USDA, 1961). Severely eroded places maybe more common in this unit on the surface with a few gullies in places. The color of the surface soil ranges from very dark brown and dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low. Some severely eroded areas may be common on the surface for the AcC2 soil type, as well as a few shallow gullies.

Soils that fall into the Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded (AcD2) consists of friable soils that have developed in old alluvium on foot slopes and along the

base of mountains (USDA, 1961). These soils have stronger slopes, a thinner solum, and more rapid runoff than the Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2). The color of the surface soil ranges from reddish-brown to dark reddish brown gravely clay loam. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 to more than 8 feet. Infiltration is slow and the capacity for available moisture is low.

Soils that fall into the Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded (AcE2) consists of surface soil that is very dark brown to very dark grayish–brown gravelly loam, 6 to 8 inches thick (USDA, 1961). These soils have stronger slopes, a thinner solum and more rapid runoff than Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded (AcD2) and a low capacity to hold water. In many places, severely eroded patches and shallow gullies are common. The plow layer is reddish-brown to dark reddish-brown gravelly clay loam.

The third series of soils found at the Ranges West of Iron Mountain Road is the Philo and Stendal Series of soils. The Philo Series consists of strongly acid, moderately well-drained soils that are developing in local and general alluvium. The parent material washed mainly from sandstone and shale, but some of it originated from limestone. Philo soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is very dark grayish-brown to dark-brown fine sandy loam, and the subsoil is dark-brown, slightly mottled fine sandy loam.

The Stendal Series consists of strongly acid, somewhat poorly drained soils that are developing in general alluvium that washed chiefly from sandstone and shale. Some of the material originated from limestone. These soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is a dark grayish-brown fine sandy loam and the subsurface soil is a dark-brown, mottled fine sandy loam.

Soils that fall into the Philo and Stendal soils local alluvium, 0 to 2 percent slopes (PkA) are found only in the northern section of the Ranges West of Iron Mountain Road along the large stream that flows north under Summerall Gate Road (USDA, 1961). This mapping unit is on foot slopes along and at the heads of small drainages or draws.

1.3 Scope of Work

The scope of work for activities associated with the SI at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, as specified by the statement of work (USACE, 1997 and 1999b), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Develop the site-specific UXO safety plan attachment.
- Conduct a surface and near-surface UXO survey for the purpose of UXO avoidance over all areas to be included in the supplemental sampling effort.
- Provide downhole UXO support for the purpose of UXO avoidance for all intrusive drilling to determine buried downhole hazards.
- Collect 101 surface soil samples, 101 subsurface soil samples, 76 groundwater samples, 22 surface water samples, and 22 sediment samples to determine whether potential site-specific chemicals (PSSC) are present at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, and to provide data useful for supporting any future planned corrective measures and closure activities.
- Samples will be analyzed for the parameters listed in Section 4.5.

Several of the Ranges West of Iron Mountain Road fall within the "Possible Explosive Ordnance Impact Areas" shown on Plate 10 of the *Archives Search Report, Maps* (USACE, 1999a), and therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Ranges West of Iron Mountain Road. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance. The site-specific UXO safety plan will be used to support hazardous toxic and radiologic waste (HTRW) and construction activities at the Ranges West of Iron Mountain Road should incidental ordnance, explosives, and UXO be encountered and require avoidance or disposal.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at these sites, and to recommend further actions, if appropriate. SI sampling reports will be prepared in accordance with current U.S. Environmental Protection Agency (EPA), Region IV and the Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense (DOD) guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria.

1. Areas where no storage, release, or disposal (including migration) has occurred
2. Areas where only release or disposal of petroleum products has occurred
3. Areas of contamination below action levels
4. Areas where all necessary remedial actions have been taken
5. Areas of known contamination with removal and/or remedial action underway
6. Areas of known contamination where required response actions have not been taken
7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

A = Asbestos (in buildings)
L = Lead-Based Paint (in buildings)
P = Polychlorinated biphenyls
R = Radon (in buildings)
RD = Radionuclides/Radiological Issues
X = Unexploded Ordnance
CWM = Chemical Warfare Material.

The EBS was conducted in accordance with the CERFA (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews

were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Training Area T-4, Parcel 181(7), is the only site within the Ranges West of Iron Mountain Road that has been previously investigated. SAIC compiled an SI report in 1995 from limited investigations conducted by the U.S. Army and SAIC. Later, SAIC performed a limited RI of Training Area T-4, Parcel 181(7), and compiled the report in 1995. The following is a summary of the SI and RI reports prepared by SAIC.

Summary of Training Area T-4, Parcel 181(7), SI Report By SAIC, 1993. HD was not detected in surface soil samples collected by the Army in April and July 1973; however, subsurface soil samples were not collected at that time (SAIC, 1993). The use of the area was limited to surface activity in the unlikely event that some HD may have been used at the site, and because subsurface sampling had not been conducted at the site. The identified area of the former site had been extensively reworked and there was not any evidence of a former site observed at the location identified by the Base during the October 1991 site visit by USATHAMA and SAIC (SAIC, 1993). Based on the inability to locate the former site and the fact that biological simulants are not persistent in the environment, additional investigative activities were not conducted at Training Area T-4 during the SI (SAIC, 1993).

During the October 1991 visit, it was concluded that further sampling activities would not be conducted at Training Area T-4 because the site could not be adequately located (SAIC, 1993). Biological simulants reportedly used at Training Area T-4 are not environmentally persistent and were used in minimal quantities (SAIC, 1993). However, SAIC did perform a limited RI at Training Area T-4, Parcel 181(7), as discussed below.

Summary of Training Area T-4, Parcel 181(7), RI Report by SAIC, 1995. Area T-4 was investigated by miniature continuous air sampling system (MINICAMS) screening of soil samples and magnetometer surveying over a site area that was located based on historical records and site photography (SAIC, 1995). Surface evidence of the former training area was not

observed. The MINICAMS screening, soil sample, and geophysical survey area locations are shown on Figure 2-1.

Field screening for CWM (sarin [GB], VX, and HD) was conducted by the U.S. Army Technical Escort Unit on surface and subsurface soils at Area T-4 in May 1994. Field procedures for MINICAMS screening are discussed in Appendix A. Samples were analyzed for HD, VX, and GB agents. Based on the results of the MINICAMS analyses, CWM was not detected in any screened samples from the site. MINICAMS screening locations are shown on Figure 2-1 and the tabulated results of the screening analyses are provided in Table 2-1.

Based on historical photography at Area T-4 depicting a concrete monument in a disturbed area, a geophysical survey incorporating tandem magnetometers was completed over the entire documented extent of Training Area T-4 in May 1995 (SAIC, 1995). Staked location T-4-10 shown in Figure 2-1 was used as a global positioning system (GPS) reference station during the survey. Approximately 50 subsurface targets were identified at Area T-4 based on the tandem magnetometer survey. The targets ranged between 0.0 and 8.8 feet in depth (estimated) and indicate that subsurface burials are present at the site. The nature of the burials (e.g., ordnance, steel fragments, drums, building materials, old fence) is unknown (SAIC, 1995). Several areas within the site boundary were inaccessible because of tree clusters and could not be surveyed using the GPS method (SAIC, 1995). The locations of the identified targets are shown on Figure 2-1. The spatial distribution of the mapped anomalies is indicative of metallic debris scattered within and beyond the site boundaries.

Four shallow soil samples were collected across Training Area T-4 for analysis of HD and VX breakdown products (Figure 2-1) (SAIC, 1999). Table 2-2 lists the RI soil sample results from Training Area T-4. Based on the results of the MINICAMS screening and laboratory analysis, CWM (HD,VX) degradation products were not detected in the shallow soils at Area T-4 (SAIC, 1999).

Based on a SAIC site reconnaissance, August 29 through 31, 1994, the site is mostly cleared, with bare ground covered with chert and small cobbles (SAIC, 1999). In the center of the turnaround of the road, there are a few small blackjack oak, southern red, smaller pines, and black cherry trees. The site is surrounded by small blackjack oak, black oak, sourwood, Virginia pine, loblolly pine, and black cherry trees, with a very high stem count per acre. A few trees are up to 8 inches in diameter at breast height, and most trees are 30 to 40 feet tall (SAIC, 1999).

DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. RAGSDALE
PROJ. MGR.: J. YACOUB
INITIATOR: J. RAGSDALE
DWG. NO.: ...\796887es.101
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STARTING DATE: 06/12/00
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E 662,400

E 662,900

N 1,165,100

N 1,164,800

PARCEL 181(7)

825

850

875

900

1 T4-S01

2

3 T4-S02

4

5

6

7

8 T4-S03

9

10 T4-S04

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- PARCEL BOUNDARY
- SITE BOUNDARY, SAIC, 1995
- SURFACE DRAINAGE / CREEK
- HISTORICAL FEATURES, SAIC, 1995
- SAIC MINICAMS SCREENING LOCATION
- SAIC MINICAMS SCREENING LOCATION WITH SOIL SAMPLE
- SAIC MAGNETOMETER ANOMALY

SCALE

0 50 100 FEET

SOURCE: SCIENCE APPLICATION INTERNATIONAL CORPORATION, 1995, "DRAFT FORT McCLELLAN REMEDIAL INVESTIGATION REPORT", AUGUST.

FIGURE 2-1
RI SOIL SAMPLE LOCATIONS
TRAINING AREA T-4
PARCEL 181(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

Table 2-1

USATEU Results of MINICAMS Screening – Training Area T-4, Parcel 181(7)[a] Ranges West of Iron Mountain Road Fort McClellan, Calhoun County, Alabama

Sample Number	Date Sampled	Sample Depth (feet)	HD(TWA)[b]	VX(TWA)[b]	GB(TWA)[b]
T4-1	5/10/94	0.05	0.00	0.01	0.00
T4-2	5/10/94	0.05	0.00	0.11	0.01
T4-3	5/10/94	0.05	0.00	0.00	0.01
T4-4	5/10/94	0.05	0.00	0.12	0.01
T4-5	5/10/94	0.05	0.00	0.00	0.01
T4-6	5/10/94	0.05	0.00	0.10	0.01
T4-7	5/10/94	0.05	0.00	0.00	0.01
T4-8	5/10/94	0.05	0.00	0.08	0.01
T4-9	5/10/94	0.05	0.00	0.00	0.01
T4-10	5/10/94	0.05	0.00	0.00	0.01

[a]Science Applications International Corporation, 1995, *Fort McClellan Remedial Investigation Report,* August.

[b]Reported values are below the 0.8 time-weighted average (TWA) for the Miniature Continuous Air Monitoring System and are not indicative of detected chemical warfare agent (U.S. Army Technical Escort Unit (USATEU), 6/92). See Appendix A for MINICAMS procedure and TWA definition.

HD - Distilled mustard.
VX - Nerve agent.
GB - Sarin.

Table 2-2

RI Soil Sample Results Summary[a]
Training Area T-4, Parcel 181(7)
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Site ID		T4-S01	T4-S02	T4-S03	T4-S04
Field Sample Number		SAIC01	SAIC01	SAIC01	SAIC01
Sample Type		Soil	Soil	Soil	Soil
Collection Date:		5/11/1994	5/11/1994	5/11/1994	5/11/1994
Depth (feet)		0	0	0	0
GB/VX Breakdown Product					
Laboratory ID Number		MCSB 107	MCSB 108	MCSB 8	MCSB 7
Parameter	units				
Chloroacetic Acid	µg/g	0.500 LT	0.500 LT	0.500 LT	0.500 LT
Fluoroacetic Acid	µg/g	0.182 LT	0.182 LT	0.182 LT	0.182 LT
Isopropyl Methylphosphonate	µg/g	0.500 LT	0.500 LT	0.500 LT	0.500 LT
Methylphosphonic Acid	µg/g	0.500 LT	0.500 LT	0.500 LT	0.500 LT
HD Breakdown Product					
Laboratory ID Number		MCSB 107	MCSB 108	MCSB 8	MCSB 7
Parameter					
Benzothiazole	µg/g	1.08 LT	1.08 LT	1.08 LT	1.08 LT
Dimethyl Disulfide	µg/g	0.692 LT	0.692 LT	0.692 LT	0.692 LT
Thiodiglycol	µg/g	3.94 LT	3.94 LT	3.94 LT	3.94 LT

[a] Science Applications International Corporation, 1999, *Draft Final Fort McClellan Remedial Investigation/Baseline Risk Assessment Report,* February.

LT - Less than the certified reporting limit.
µg/g - Micrograms per gram.
HD - Distilled mustard.
GB - Sarin.
VX - Nerve agent.

Exposure Assessment. Habitat appropriate for terrestrial biota is present at Area T-4, so it is
necessary to evaluate exposures to terrestrial receptors at the site. Surface soil samples taken at Area T-4 were analyzed for CWM breakdown products only. Therefore, no further risk characterization for ecological receptors was performed (SAIC, 1999).

Risk Characterization. There were no unacceptable risks to ecological receptors found at Area T-4 because site media were evaluated only for CWM breakdown products (SAIC, 1999).

The Ranges West of Iron Mountain Road, Parcels 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, were identified as Category 1 CERFA sites, and some were qualified "X" for UXO. These CERFA sites are parcels where no known or recorded storage, release, or disposal (including migration) has occurred on site property, but some are qualified for potential UXO. The Ranges West of Iron Mountain Road also require additional evaluation to determine the environmental condition of the parcels.

Parcels 181(7), 194(7), and 518(7) were identified as Category 7 CERFA sites. CERFA sites are parcels where site-specific chemicals were stored, and possibly released onto the site or to the environment, and/or were disposed of on site properly. Category 7 CEFRA sites are areas that lack adequate documentation and, therefore, require additional evaluation to determine the environmental condition of the parcel.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples, and the procedures necessary to meet the objectives of the SI and establish a basis for future action at these sites.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program (CLP)-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data, related to the SI at the Ranges West of Iron Mountain Road are summarized in Table 3-1 and have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the sites. The data users for the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also

Table 3-1

Summary of Data Quality Objectives
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Potential Data Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other contractors, and possible future land users	Limited SI for Area T-4, Parcel 181(7), data from the SAIC Fort McClellan Site Investigation Report, August 1993 Limited RI data for Parcel 181(7) from the SAIC Fort McClellan Site Investigation Report, August 1995	<u>Contaminant Source</u> Ranges West of Iron Mountain Road (munitions, UXO, biological simulants and decontamination solutions) <u>Migration Pathways</u> Infiltration and leaching to subsurface soil and groundwater, biotransfer to deer through browsing, dust emissions and volatilization to ambient air, discharge of groundwater to surface water, and runoff and erosion to surface water and sediment <u>Potential Receptors</u> Recreational site user (current and future) construction worker (future), grounds-keeper (future), and resident (future) <u>PSSC</u> (Based on the history of each individual site) munitions, lead, nitroexplosives, tear gas, flares, napalm, white phosphorus, molasses residue, field flame expedient, supertropical bleach, Decontamination Solution Number 2, and practice smoke grenades	<u>Surface soil</u> <u>Subsurface Soil</u> <u>Groundwater</u> <u>Surface Water</u> <u>Sediment</u>	SI to confirm the presence or absence of contamination in the site media Definitive quality data for future decision-making	<u>Surface soil</u> TAL Metals, Nitroexplosives, Perchlorate In addition, TCL VOCs and TCL SVOCs for Parcels 181(7) and 194(7)	Definitive data in CESAS Level B data packages	101 direct-push soil samples + QC
					<u>Subsurface Soil</u> TAL Metals, Nitroexplosives, Perchlorate In addition, TCL VOCs and TCL SVOCs for Parcels 181(7) and 194(7)	Definitive data in CESAS Level B data packages	101 direct-push soil samples + QC
					<u>Groundwater</u> TCL VOCs, TAL Metals, Nitroexplosives, Perchlorate In addition, TCL SVOCs for Parcels 181(7) and 194(7)	Definitive data in CESAS Level B data packages	76 groundwater samples + QC
					<u>Surface Water</u> TAL Metals, Nitroexplosives, Perchlorate, In addition, TCL VOCs and TCL SVOCs and TCL SVOCs for Parcels 181(7) and 194(7)	Definitive data in CESAS Level B data packages	22 surface water samples + QC
					<u>Sediment</u> TAL Metals, Nitroexplosives, Perchlorate, TOC, and Grain Size In addition, TCL VOCs and TCL SVOCs for Parcel 181(7) and 194(7)	Definitive data in CESAS Level B data packages	22 sediment samples + QC

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
CWM - Chemical warfare material.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
PSSC - Potential site-specifc chemical.
QC - Quality control.
RI - Remedial investigation.
SI - Site inspection.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile organic compound.

been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of risk to human health through graphically presenting possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact scenarios with a contaminated source medium.

Primary contaminant releases were probably limited to leaks and spills, UXO, and lead associated with small arms ammunition that entered surface soil and potentially buried materials. Potential contaminant transport pathways include infiltration and leaching to subsurface soil and groundwater, biotransfer to deer, dust emissions and volatilization to ambient air, discharge of groundwater to surface water, and erosion and runoff to surface water and sediment.

Currently the sites are restricted to unauthorized use and are not utilized. The sites have an overgrowth of vegetation and are not fenced. There are large number of open and wooded areas in and around the sites; therefore, people may trespass at the sites and may hunt for deer. Other potential receptors considered, but not included under current land-use scenarios, are the following:

- ***Groundskeeper.*** The sites are not currently maintained by a groundskeeper.
- ***Construction Worker.*** The sites are unused, and no development or construction is occurring or scheduled.

- ***Resident.*** The sites are not currently used for residential purposes.

Future land use in this area for the Ranges West of Iron Mountain Road is expected to include as five different land uses (FTMC, 1997). It includes:

- The eastern bypass will be constructed to enter the west side of the Main Base along the south side of Summerall Road and turning south will replace part of Iron Mountain Road.

- A large part of the southern and eastern area of the Ranges West of Iron Mountain Road will be remediation reserve and will likely be used for passive recreation and open space (FTMC, 1997). Third, the area just southwest of the intersection of Summerall Road and Iron Mountain Road will be developed into McClellan Commercial Center.

- Land south of Largarde Park along the western boundary of the Base will be acquired by the City of Anniston to expand the park.

- Land on the east side of Iron Mountain Road and along the base of the north slope of Sunset Hill is slated to be a part of the Retirement Development Reserve.

Until remediation has been completed because of the potential for UXO, the sites may not be deemed safe for public access (FTMC, 1997). Plausible future land use receptor scenarios addressed in the CSEM include:

- ***Resident.*** The residential scenario is considered because of the potential retirement development. The residential scenario is considered for all areas in order to provide information for the project manager and regulators.

- ***Construction Worker.*** The construction worker scenario is considered because of the large amount of construction to be scheduled for this area in building the eastern bypass and developing the McClellan Commercial Center.

- ***Groundskeeper.*** The sites are likely to have many areas that will need to be maintained in the future such as along the eastern bypass and the McClellan Commercial Center.

- ***Recreational Site User.*** The sites have areas planned for recreational use. Deer hunting is a potential exposure pathway for the recreational site user.

Exposure pathways that are excluded from the CSEM include:

- ***Fish Consumption.*** Fish consumption is not considered for the recreational site user receptor current or future scenarios because the intermittent streams are not large enough to support fishing.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for the sites is provided in Table 3-1 and Figure 3-1.

3.4 Decision-Making Process, Data Uses, and Needs

The decision-making process consists of a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the SI at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, will be based on comparing detected site chemicals of potential concern to site-specific screening levels developed in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). EPA definitive data with CESAS Level B data packages will be used to determine whether or not PSSCs are detected in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

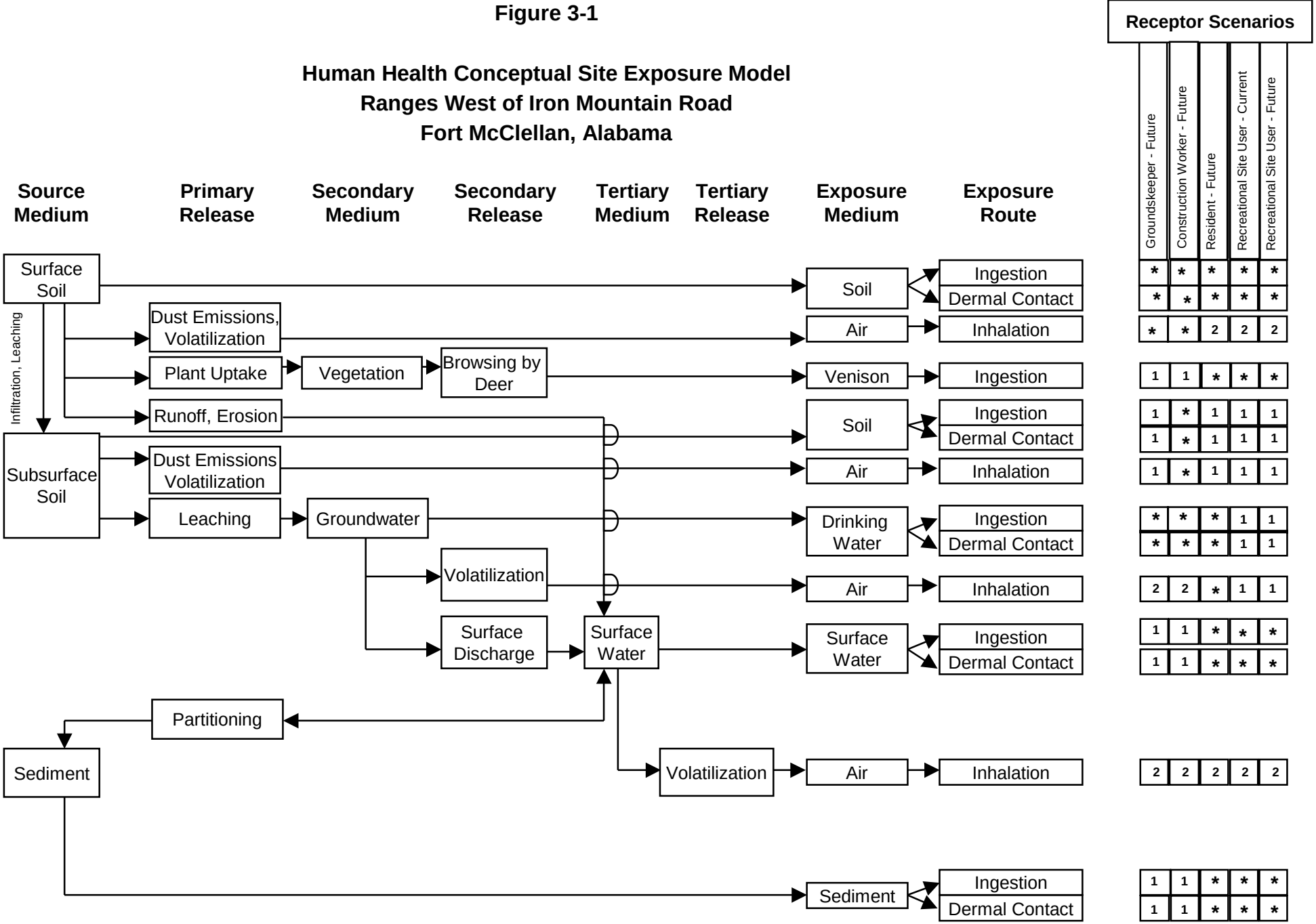
Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in accordance with the procedures in the WP.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, groundwater, surface water, and sediment samples will be sampled and analyzed to meet the objectives of the SI at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range. Quality assurance/quality control (QA/QC) samples will be collected for all

Figure 3-1

Human Health Conceptual Site Exposure Model
Ranges West of Iron Mountain Road
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.
1 = Incomplete exposure pathway.
2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available; comply with EPA definitive data requirements; and be reported using hard copy data packages and electronic copies. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, RI, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

Several of the Ranges West of Iron Mountain Road fall within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the *Archives Search Report, Maps* (USACE, 1999a). Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance and construction activities for hazardous, toxic and radiological waste investigations, sample collection and analysis at the Ranges West of Iron Mountain Road. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for each avoidance. Subsurface metallic anomalies will not be disturbed, and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in site-specific UXO safety plan and Chapter 4.0 and Appendix E of the approved SAP (IT, 2000a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet below ground surface (bgs), whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the

locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

Most of the firing lines have been identified in the EBS (ESE, 1998) or in the ASR (USACE, 1999a) along with range safety fans that include probable impact areas. However, most of the ranges overlap and it is very difficult to separate the impact areas of the overlapping ranges. Therefore, the SI for the Ranges West of Iron Mountain Road will focus on individual firing lines, impact areas, and areas of activities where possible contamination may exist rather than investigating each range or parcel as a unit. The probable impact areas are shown on Figure 1-3 and will be addressed together during this SI. The proposed sample location nomenclature (shown on Figure 4-1 and the sample tables) will follow the designation of the site or range parcel where the sample is collected. However, with overlapping ranges, a primary parcel designation will be used for a majority of the proposed sample locations throughout the overlapping areas.

Some of the actual impact areas were determined in the study area for this SI. Information for the location of the actual impact areas was collected from several sources. These sources include the following:

- Presentation to the Base Realignment and Closure Cleanup Team by Foster-Wheeler, May 17, 2000
- UXO field survey data obtained by EOD Technology, Inc. that identified areas of dense munitions fragments and UXO during UXO surveys to clear the eastern bypass right-of-way
- Field observations by IT during site walks in July 2000.

.

Figure 1-3 presents the study area for the Ranges West of Iron Mountain Road with the probable UXO impact areas represented by colored polygons. The larger impact areas (shown by red and blue polygons) identify probable impact areas based on high-density UXO areas (within red polygons) and medium-density areas (within blue polygons). These large polygons shown on Figures 1-3 and 4-1 were developed through records review and field reconnaissance conducted by Foster-Wheeler (Foster-Wheeler, 2000).

The smaller, brown polygons labeled with letters are estimated areas of impact based on high density of munition fragments and UXO located by EOD Technology, Inc., surveys for the areas within the eastern bypass right-of-way. EOD Technology, Inc., did not survey areas outside the eastern bypass right-of-way. The other brown polygons with numerals represent areas with notable physical characteristics (e.g. trenches, depressions, mounds, berms, etc.) observed by IT field personnel during site visits conducted in July 2000. IT personnel were unable to walk some of the areas due to access restrictions because of ongoing UXO remediation in the area of the eastern bypass right-of-way. This included a large area in the center of Parcel 232Q-X from the eastern edge of Parcel 181(7) east to Iron Mountain Road and from Summerall Gate Road south to just south of Iron Mountain and Parcel 91Q-X.

The environmental sampling program at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, includes the collection of surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analyses. These samples will be collected and analyzed to provide data for characterizing the ranges and sites within the study area, determining the environmental condition of the ranges and sites, and determining if any further action is to be conducted.

Soil samples have been proposed in or adjacent to each area of concern to determine if contaminated soil exists in these areas. Also, soil borings will be used to collect data to determine site-specific geology. Groundwater sample locations have been proposed in areas of concern, downgradient of areas of concern, and in typically low-lying areas to establish the groundwater quality of the study area. The groundwater monitoring wells will be used to collect samples and data to provide information on groundwater quality in the residuum aquifer and to determine local groundwater flow direction. Surface water and sediment sample locations are proposed as potential downgradient sinks for PSSC from the site and evidence of PSSC mobility within the site may likely be reflected at these locations.

The proposed samples will be collected from the environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the ranges and sites.

In addition to the samples proposed in the following sections, existing sample locations are shown on Figure 4-1 where samples were collected under separate investigations from adjacent parcels or parcels within the Ranges West of Iron Mountain Road. For example, surface water and sediment samples collected from Remount Creek that flows north along the east side of Iron Mountain Road are shown on Figure 4-1. The analytical results from these existing samples will be evaluated along with the results of proposed samples collected within the Ranges West of Iron Mountain Road study area. Surface water from the eastern side of the study area near Iron mountain Road potentially flows east to Remount Creek.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from 101 locations at the Ranges West of Iron Mountain Road.

4.2.1.1 Sample Locations and Rationale

The surface soil sampling rationale are listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 4.7.1.1 of the SAP (IT, 2000). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only, and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custodies will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from 101 borings installed at the Ranges West of Iron Mountain Road.

4.2.2.1 Sample Locations and Rationale

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
181(7)	HR-181-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the southwestern area of Parcel 181(7) near the large pits/trenches. Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-181-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the eastern area of Parcel 181(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
		Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northern area of Parcel 181(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
194(7)	HR-194-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the southern area of Parcel 194(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-194-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed potentially downgradient of most of the site in the northwestern area of Parcel 194(7). Sample data will indicate if contaminant releases into the environment have occurred upgradient of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-194-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed potentially downgradient of most of the site in the northeast area of Parcel 194(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potentially impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
73Q-X	HR-73Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the upgradient southwest end of the probable firing line of Parcel 73Q-X. Sample data will indicate if contaminant releases into the environment have occurred in this area of the probable firing line and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-73Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the potentially downgradient northeast end of the probable firing line of Parcel 73Q. Sample data will indicate if contaminant releases into the environment have occurred in this area of the probable firing line and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-73Q-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed near the western boundary of Parcel 73Q-X in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the potential impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-73Q-MW04	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center section of Parcel 73Q-X in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the potential impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-73Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northern section of Parcel 73Q-X in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the potential impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-73Q-SW/SD01	Surface water and sediment	Sample location is northwest of Parcel 73Q-X in the intermittent stream that flows north west of the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
91Q-X	HR-91Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northwest corner of Parcel 91Q-X potentially downgradient of the impact area identified by EODT and Parcel 200Q firing line. Sample data will indicate if contaminant releases into the environment have occurred from the potential impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed just west (outside) of the northwest corner of Parcel 91Q-X potentially downgradient of the impact area identified by EODT and Parcel 200Q firing line. Sample data will indicate if contaminant releases into the environment have occurred from the potentially impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potentially impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northern central section of Parcel 91Q-X, east of the firing line for Parcel 200Q. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW04	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northern central section of Parcel 91Q-X, east of the firing line for Parcel 200Q. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-91Q-MW05	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed west of Parcel 91Q-X, near the FTMC boundary, and near the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW06	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed east of Parcel 91Q-X, near Iron Mountain Road, and in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW07	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed near the east boundary of Parcel 91Q-X, west of Iron Mountain Road, and in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW08	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed east of the central section of Parcel 91Q-X, near Iron Mountain Road. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-MW09	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed outside the southeast corner of Parcel 91Q-X, just west of Iron Mountain Road, and in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-91Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed near the top of Iron Mountain in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-91Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed north and potentially downgradient of the top of Iron Mountain in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-91Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northeast corner of Parcel 91Q-X in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-91Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed south of the top of Iron Mountain in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
91Q-X	HR-91Q-GP05	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed outside the southeast corner of Parcel 91Q-X in the impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-91Q-SW/SD01	Surface water and sediment	Sample location is north of Parcel 91Q-X in the intermittent stream that flows north away from the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
114Q-X	HR-114Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center area of the firing line for Parcel 114Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-114Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in Parcel 114Q-X, in front (east) of the firing line for Parcel 201Q and potentially downgradient of the small arms impact area for 114Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-114Q-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in Parcel 114Q-X, in front (east) of the firing line for Parcel 201Q and potentially downgradient of the small arms impact area for 114Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-114Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed near the southern edge of Parcel 114Q-X and potentially downgradient of most of the small arms impact area. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-114Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the center of Parcel 114Q-X in the bare area observed in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-114Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the central area of Parcel 114Q-X in the bare area observed in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-114Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the eastern section of Parcel 114Q-X in the bare area observed in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-114Q-SW/SD01	Surface water and sediment	Sample location is the pond north of Parcel 114Q-X at the FTMC Boundary and south of Lagarde Park. The pond is down gradient of the small arms impact area. Sample data will indicate if contaminant releases have occurred from runoff into the pond from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
115Q	HR-115Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the northwest end of the probable firing line for Parcel 115Q and potentially downgradient of the impact area. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-115Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the impact area for Parcel 115Q next to the first berm from the firing range. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-115Q-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the impact area for Parcel 115Q next to the second berm from the firing line. Sample data will indicate if contaminant releases into the environment have occurred from the small arms impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-115Q-MW04	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the southeast corner of the impact area for Parcel 115Q next to the third berm from the firing line. Sample data will indicate if contaminant releases into the environment have occurred from the probable impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
115Q	HR-115Q-MW05	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the east of the probable impact area for Parcel 115Q and potentially downgradient of the trench area east of Parcel 115Q. Sample data will indicate if contaminant releases into the environment have occurred from the probable impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-115Q-SW/SD01	Surface water and sediment	Sample location is just north of Parcel 115Q impact area on the intermittent stream that flows west. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-115Q-SW/SD02	Surface water and sediment	Sample location is just south of Parcel 115Q firing line on the intermittent stream that flows northwest. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
116Q-X	HR-116Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the north end of the firing line trench for Parcel 116Q-X and potentially downgradient of the rest of the firing line trench. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the south end of the firing line trench for Parcel 116Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-116Q-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 1500 feet north, northeast of the main firing ling for Parcel 116Q-X potential downgradient of an area of small arms casings and smoke grenades and flare fragments. This sample location is also potential downgradient of probable impact and trench areas. Sample data will indicate if contaminant releases into the environment have occurred from the upgradient probable impact areas and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW04	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed just west of Iron Mountain Road in a bare area seen in the 1969 aerial photograph and later that appears to have had much activity. Also, area was identified as an impact area by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW05	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 50 feet west of Iron Mountain Road in the northern end of a bare area seen in the 1969 aerial photograph and later that appears to have had much activity. Also, area was identified by EODT as an impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW06	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed just east and outside of the firing line trench for Parcel 116Q X. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW07	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 1200 feet northeast of the main firing ling for Parcel 116Q-X in a probable impact area with several large trenches. Sample data will indicate if contaminant releases into the environment have occurred from the probable impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW08	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 1500 feet northeast of the firing line for Parcel 116Q-X (60mm mortar range) on a west facing slope containing 60mm mortar fragments in an obvious impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
116Q-X	HR-116Q-MW09	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 1700 feet northeast of the firing line for Parcel 116Q-X (60mm mortar range) on a west facing slope containing 60mm mortar fragments in an obvious impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-116Q-MW10	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 1500 feet east of the firing line for Parcel 116Q-X (60mm mortar range) on a northwest facing slope containing 60mm mortar fragments in an obvious impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW11	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 900 feet east of the firing line for Parcel 116Q X (60mm mortar range) on a north facing slope in a potential impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW12	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 2100 feet northeast of the firing line for Parcel 116Q-X (60mm mortar range) on a northwest facing slope containing multiple depressions in a probable impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW13	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed just west of Iron Mountain Road in a potential downgradient area identified as an impact area by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW14	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed just west of Iron Mountain Road in a potential downgradient area identified as an impact area by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-MW15	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed about 1000 feet southwest of the top of Iron Mountain in a potential impact area. Sample data will indicate if contaminant releases into the environment have occurred from the potential impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-116Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed about 1100 feet south of the top of Iron Mountain in a potential impact area. Sample data will indicate if contaminant releases into the environment have occurred from the potential impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-116Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed approximately 1400 feet northeast of the main firing ling for Parcel 116Q-X in a probable impact area with several large trenches. Sample data will indicate if contaminant releases into the environment have occurred from the probable impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-116Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed approximately 700 feet west and potentially downgradient of Wheeler Hill. Sample data will indicate if contaminant releases into the environment have occurred from activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-116Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed approximately 400 feet northwest and potentially downgradient of Wheeler Hill in an impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-116Q-GP05	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed approximately 300 feet south and potentially downgradient of Wheeler Hill .in an impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-116Q-GP06	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed approximately 300 feet west of Iron Mountain Road in a bare area seen in the 1969 aerial photograph and later that appears to have had much activity. Also, area was identified by as an impact area by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-116Q-SW/SD01	Surface water and sediment	Sample location is south of Parcel 116Q-X firing line on the intermittent stream that flows north into the FTMC property just south of Parcel 116Q-X firing line. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-116Q-SW/SD02	Surface water and sediment	Sample location is northeast of Parcel 116Q-X firing line on the intermittent stream that flows north across Parcel 116Q-X. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
116Q-X	HR-116Q-SW/SD03	Surface water and sediment	Sample location is northeast of the impact area for Parcel 116Q-X firing line on the intermittent stream that flows west across Parcel 116Q-X. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-116Q-SW/SD04	Surface water and sediment	Sample location is approximately 1300 feet east of the firing line area for Parcel 116Q-X on the intermittent stream that flows northwest near the southern boundary of the study area. Sample data will indicate if contaminant releases have occurred from runoff from former activities in the southern part of the study area. Sample data will also be used to asses potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
117Q-X	HR-117Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed about 1600 feet east of the probable firing line for Washington Tank Range between the intermittent stream and the east/west road that travels through Parcel 117Q-X. Sample data will indicate if contaminant releases into the environment have occurred from activities in this area and upgradient and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-117Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed about 1100 feet east of the probable firing line for the Washington Tank Range in an area potential downgradient of several large trenches. Sample data will indicate if contaminant releases into the environment have occurred from the trench area and if contaminated soil exists at this location. Soil sample data will also be used to asses potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater in the residuum aquifer.
	HR-117Q-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed southeast of Parcel 115Q, potential downgradient of several large trenches. Sample data will indicate if contaminant releases into the environment have occurred from the trench area and if contaminated soil exists at this location. Soil sample data will also be used to asses potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater in the residuum aquifer.

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-117Q-MW04	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed near the western border of the FTMC boundary and Parcel 117Q-X near the bare area seen in the aerial photographs to be potentially the Washington Tank Range firing lines. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater in the residuum aquifer.
	HR-117Q-MW05	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed southeast of Parcel 115Q, in an area of several large trenches. Sample data will indicate if contaminant releases into the environment have occurred from the trench area and if contaminated soil exists at this location. Soil sample data will also be used to asses potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater in the residuum aquifer.
	HR-117Q-MW06	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed approximately 1,700 feet east of probable firing line for Washington Tank Range, in an area of small ammunition casings. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to asses potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater in the residuum aquifer.
	HR-117Q-MW07	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the western edge of Parcel 117Q-X , northwest of the firing line for Parcel 116Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to asses potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater in the residuum aquifer.
	HR-117Q-MW08	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed just northeast of Parcel 114Q-X, near the FTMC boundary. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-117Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface samples to be placed near the western border of the FTMC boundary and Parcel 117Q-X near the bare area seen in the aerial photographs to be potentially the Washington Tank Range firing lines. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-117Q-SW/SD01	Surface water and sediment	Sample location is about 600 feet east of the western FTMC boundary, and south of Parcel 151Q, on the intermittent stream that flows west down gradient of several large trenches. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-117Q-SW/SD02	Surface water and sediment	Sample location is about 1500 feet east of the western FTMC boundary on the intermittent stream that flows west through Parcel 117Q-X. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
151Q	HR-151Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed northwest and potentially downgradient of the firing line for Parcel 151Q. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-151Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed at the north end of the firing line for Parcel 151Q and potentially downgradient of the likely impact area. Sample data will indicate if contaminant releases into the environment have occurred from the firing line area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-151Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed at the south end of the firing line for Parcel 151Q and potentially downgradient of the likely impact area. Sample data will indicate if contaminant releases into the environment have occurred from the firing line area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-151Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed east of the firing line for Parcel 151Q in the likely impact area. Sample data will indicate if contaminant releases into the environment have occurred from the probable impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-151Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed northeast of the firing line for Parcel 151Q in the likely impact area. Sample data will indicate if contaminant releases into the environment have occurred from the probable impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-151Q-SW/SD01	Surface water and sediment	Sample location is west of Parcel 151Q firing line on the intermittent stream that flows west just north of the parcel and then south into another intermittent stream that flows off-site the FTMC property. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
200Q	HR-200Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northeastern potential downgradient end of the Parcel 200Q probable firing line. Sample data will indicate if contaminant releases into the environment have occurred from the probable firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-200Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southwestern end of the Parcel 200Q probable firing line. Sample data will indicate if contaminant releases into the environment have occurred from the probable firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
201Q	HR-201Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center area of the firing line for Parcel 201Q. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-201Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center area of the northern half of the firing line for Parcel 201Q. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-201Q-SW/SD01	Surface water and sediment	Sample location is the intermittent stream that flows southwest out the base near the center of Parcel 201Q firing line. Sample data will indicate if contaminant releases have occurred from runoff in this area from former activities at the parcel . Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
228Q	HR-228Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the northwest end of the probable firing line for Parcel 228Q. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-228Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the southeast end of the probable firing line for Parcel 228Q. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
229Q-X	HR-229Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed at the southeast end of the probable firing line Parcel 229Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
231Q	HR-231Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the probable firing line for Parcel 231Q. Sample data will indicate if contaminant releases into the environment have occurred from the firing line and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
232Q-X	HR-232QX-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in Parcel 232Q-X between Parcel 181(7) and 194(7) in a possible impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in Parcel 232Q-X between Parcel 181(7) and 194(7) in a possible impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW03	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northeast section of Parcel 232Q-X in a possible impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-232QX-MW04	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northeast section of Parcel 232Q-X at the potential downgradient end of a large trench. Sample data will indicate if contaminant releases into the environment have occurred from the trench area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW05	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in eastern section of Parcel 232Q-X, east of Parcel 69Q, potential downgradient of a large pit. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW06	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in eastern section of Parcel 232Q-X, northeast of Parcel 69Q. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW07	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in western section of Parcel 232Q-X, north and potentially downgradient of Area M2. Sample data will indicate if contaminant releases into the environment have occurred from the activity in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW08	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in Parcel 232Q-X between Parcel 181(7) and 194(7) in a possible impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW09	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in Parcel 232Q-X between Parcel 181(7) and 194(7) in a possible impact area. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW10	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the eastern end of Parcel 232Q-X , potential downgradient of an area of several large pits/depressions. Sample data will indicate if contaminant releases into the environment have occurred from the pits/depressions area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
232Q-X	HR-232QX-MW11	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in Parcel 232Q-X, east of Parcel 181(7) in an impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW12	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in Parcel 232Q-X, east of Parcel 181(7) in an impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW13	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the central section of Parcel 232Q-X, just south of Summerall Gate Road. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW14	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in Parcel 232Q-X, just west of Iron Mountain Road in an impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW15	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in Parcel 232Q-X, just west of Iron Mountain Road in an impact area identified by EODT. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW16	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in Parcel 232Q-X, east of Parcel 69Q. Sample data will indicate if contaminant releases into the environment have occurred from the activities in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW17	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the eastern end of Parcel 232Q-X, adjacent and potentially downgradient of an area of several large pit/depression. Sample data will indicate if contaminant releases into the environment have occurred from the pit/depression area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-MW18	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the eastern end of Parcel 232Q-X, potential downgradient of an area of several large pits/depressions. Sample data will indicate if contaminant releases into the environment have occurred from the pits/depressions area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations And Rationale
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
	HR-232QX-MW19	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the eastern end of Parcel 232Q-X, potential downgradient of an area of several pits/depressions. Sample data will indicate if contaminant releases into the environment have occurred from the pits/depressions area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-232QX-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the eastern end of Parcel 232Q-X in an area of several large pits/depressions. Sample data will indicate if contaminant releases into the environment have occurred from the impact area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-232QX-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in eastern section of Parcel 232Q-X, east of Parcel 69Q, on the north facing slope of Sunset Hill. Sample data will indicate if contaminant releases into the environment have occurred from the activity in this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
\	HR-232QX-SW/SD01	Surface water and sediment	Sample location is east of Parcel 194(7) on the intermittent stream that flows north. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD02	Surface water and sediment	Sample location is east of Parcel 194(7) near the south FTMC boundary on the intermittent stream that flows north. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD03	Surface water and sediment	Sample location is northeast of Parcel 194(7), near the northern boundary of Parcel 232Q-X, on an intermittent stream that flows north under Summerall gate Road. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
232Q-X	HR-232QX-SW/SD04	Surface water and sediment	Sample location is northwest of Parcel 181(7), near the boundary of Parcel 232Q-X, on an intermittent stream that flows north under Summerall Gate Road. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD05	Surface water and sediment	Sample location is north of Parcel 181(7) near the boundary of Parcel 232Q-X on an intermittent stream that flows north. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD06	Surface water and sediment	Sample location is at the east end of Parcel 232Q-X, South of Parcel 146(7) near the FTMC boundary on an intermittent stream that flows east off the parcel. Sample data will indicate if contaminant releases have occurred from runoff from former activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD07	Surface water and sediment	Sample location is in the eastern end of Parcel 232Q-X, southeast of Parcel 69Q near the southern boundary of Parcel 232Q-X on an intermittent stream that flows northwest from Sunset Hill. Sample data will indicate if contaminant releases have occurred from upgradient of the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD08	Surface water and sediment	Sample location is in the northeastern end of Parcel 232Q-X, west of 13th Avenue on an intermittent stream that flows north under 23rd Street. Sample data will indicate if contaminant releases have occurred from upgradient of the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-232QX-SW/SD09	Surface water and sediment	Sample location is in the eastern end of Parcel 232Q-X, west of 13th Street, on an intermittent stream that flows north toward 23rd Street. Sample data will indicate if contaminant releases have occurred from upgradient of the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-181-MW01	HR-181-MW01-SS-RB0001-REG	0-1			HR-181-MW01-SS-RB0001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-181-MW01-DS-RB0002-REG	a	HR-181-MW01-DS-RB0003-FD	HR-181-MW01-DS-RB0004-FS		
HR-181-MW02	HR-181-MW02-SS-RB0005-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-181-MW02-DS-RB0006-REG	a				
HR-181-MW03	HR-181-MW03-SS-RB0007-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-181-MW03-DS-RB0008-REG	a				
HR-194-MW01	HR-194-MW01-SS-RC0001-REG	0-1			HR-194-MW01-SS-RC0001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-194-MW01-DS-RC0002-REG	a				
HR-194-MW02	HR-194-MW02-SS-RC0003-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-194-MW02-DS-RC0004-REG	a				
HR-194-MW03	HR-194-MW03-SS-RC0005-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-194-MW03-DS-RC0006-REG	a	HR-194-MW03-DS-RC0007-FD			
HR-73Q-MW01	HR-73Q-MW01-SS-JF0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-73Q-MW01-DS-JF0002-REG	a				
HR-73Q-MW02	HR-73Q-MW02-SS-JF0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-73Q-MW02-DS-JF0004-REG	a				
HR-73Q-MW03	HR-73Q-MW03-SS-JF0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-73Q-MW03-DS-JF0006-REG	a				
HR-73Q-MW04	HR-73Q-MW04-SS-JF0007-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-73Q-MW04-DS-JF0008-REG	a				
HR-73Q-GP01	HR-73Q-GP01-SS-JF0009-REG	0-1			HR-73Q-GP01-SS-JF0009-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-73Q-GP01-DS-JF0010-REG	a				
HR-91Q-MW01	HR-91Q-MW01-SS-JH0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW01-DS-JH0002-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-91Q-MW02	HR-91Q-MW02-SS-JH0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW02-DS-JH0004-REG	a				
HR-91Q-MW03	HR-91Q-MW03-SS-JH0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW03-DS-JH0006-REG	a				
HR-91Q-MW04	HR-91Q-MW04-SS-JH0007-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW04-DS-JH0008-REG	a	HR-91Q-MW04-DS-JH0009-FD	HR-91Q-MW04-DS-JH0010-FS		
HR-91Q-MW05	HR-91Q-MW05-SS-JH0011-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW05-DS-JH0012-REG	a				
HR-91Q-MW06	HR-91Q-MW06-SS-JH0013-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW06-DS-JH0014-REG	a				
HR-91Q-MW07	HR-91Q-MW07-SS-JH0015-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW07-DS-JH0016-REG	a				
HR-91Q-MW08	HR-91Q-MW08-SS-JH0017-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW08-DS-JH0018-REG	a				
HR-91Q-MW09	HR-91Q-MW09-SS-JH0019-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-MW09-DS-JH0020-REG	a				
HR-91Q-GP01	HR-91Q-GP01-SS-JH0021-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-GP01-DS-JH0022-REG	a				
HR-91Q-GP02	HR-91Q-GP02-SS-JH0023-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-GP02-DS-JH0024-REG	a	HR-91Q-GP02-DS-JH0025-FD	HR-91Q-GP02-DS-JH0026-FS		
HR-91Q-GP03	HR-91Q-GP03-SS-JH0027-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-GP03-DS-JH0028-REG	a				
HR-91Q-GP04	HR-91Q-GP04-SS-JH0029-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-GP04-DS-JH0030-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-91Q-GP05	HR-91Q-GP05-SS-JH0031-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-91Q-GP05-DS-JH0032-REG	a				
HR-114Q-MW01	HR-114Q-MW01-SS-JJ0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-MW01-DS-JJ0002-REG	a				
HR-114Q-MW02	HR-114Q-MW02-SS-JJ0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-MW02-DS-JJ0004-REG	a				
HR-114Q-MW03	HR-114Q-MW03-SS-JJ0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-MW03-DS-JJ0006-REG	a	HR-114Q-MW03-DS-JJ0007-FD			
HR-114Q-GP01	HR-114Q-GP01-SS-JJ0008-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-GP01-DS-JJ0009-REG	a				
HR-114Q-GP02	HR-114Q-GP02-SS-JJ0010-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-GP02-DS-JJ0011-REG	a				
HR-114Q-GP03	HR-114Q-GP03-SS-JJ0012-REG	0-1			HR-114Q-GP03-SS-JJ0012-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-GP03-DS-JJ0013-REG	a				
HR-114Q-GP04	HR-114Q-GP04-SS-JJ0014-REG	0-1			HR-114Q-GP03-SS-JJ0014-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-114Q-GP04-DS-JJ0015-REG	a	HR-114Q-GP04-DS-JJ0016-FD			
HR-115Q-MW01	HR-115Q-MW01-SS-JK0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-115Q-MW01-DS-JK0002-REG	a				
HR-115Q-MW02	HR-115Q-MW02-SS-JK0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-115Q-MW02-DS-JK0004-REG	a				
HR-115Q-MW03	HR-115Q-MW03-SS-JK0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-115Q-MW03-DS-JK0006-REG	a	HR-115Q-MW03-DS-JK0007-FD	HR-115Q-MW03-DS-JK0008-FS		
HR-115Q-MW04	HR-115Q-MW04-SS-JK0009-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-115Q-MW04-DS-JK0010-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-115Q-MW05	HR-115Q-MW05-SS-JK0011-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-115Q-MW05-DS-JK0012-REG	a	HR-115Q-MW05-DS-JK0013-FD	HR-115Q-MW05-DS-JK0014-FS		
HR-116Q-MW01	HR-116Q-MW01-SS-JL0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW01-DS-JL0002-REG	a				
HR-116Q-MW02	HR-116Q-MW02-SS-JL0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW02-DS-JL0004-REG	a				
HR-116Q-MW03	HR-116Q-MW03-SS-JL0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW03-DS-JL0006-REG	a				
HR-116Q-MW04	HR-116Q-MW04-SS-JL0007-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW04-DS-JL0008-REG	a				
HR-116Q-MW05	HR-116Q-MW05-SS-JL0009-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW05-DS-JL0010-REG	a				
HR-116Q-MW06	HR-116Q-MW06-SS-JL0011-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW06-DS-JL0012-REG	a			HR-116Q-MW06-DS-JL0012-MS/MSD	
HR-116Q-MW07	HR-116Q-MW07-SS-JL0013-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW07-DS-JL0014-REG	a				
HR-116Q-MW08	HR-116Q-MW08-SS-JL0015-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW08-DS-JL0016-REG	a				
HR-116Q-MW09	HR-116Q-MW09-SS-JL0017-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW09-DS-JL0018-REG	a				
HR-116Q-MW10	HR-116Q-MW10-SS-JL0019-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW10-DS-JL0020-REG	a				
HR-116Q-MW11	HR-116Q-MW11-SS-JL0021-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW11-DS-JL0022-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-116Q-MW12	HR-116Q-MW12-SS-JL0023-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW12-DS-JL0024-REG	a				
HR-116Q-MW13	HR-116Q-MW13-SS-JL0025-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW13-DS-JL0026-REG	a				
HR-116Q-MW14	HR-116Q-MW14-SS-JL0027-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW14-DS-JL0028-REG	a				
HR-116Q-MW15	HR-116Q-MW15-SS-JL0029-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-MW15-DS-JL0030-REG	a				
HR-116Q-GP01	HR-116Q-GP01-SS-JL0031-REG	0-1	HR-116Q-GP01-SS-JL0032-FD	HR-116Q-GP01-SS-JL0033-FS		TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-GP01-DS-JL0034-REG	a				
HR-116Q-GP02	HR-116Q-GP02-SS-JL0035-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-GP02-DS-JL0036-REG	a				
HR-116Q-GP03	HR-116Q-GP03-SS-JL0037-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-GP03-DS-JL0038-REG	a				
HR-116Q-GP04	HR-116Q-GP04-SS-JL0039-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-GP04-DS-JL0040-REG	a				
HR-116Q-GP05	HR-116Q-GP05-SS-JL0041-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-GP05-DS-JL0042-REG	a				
HR-116Q-GP06	HR-116Q-GP06-SS-JL0043-REG	0-1			HR-116Q-GP06-SS-JL0043-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-116Q-GP06-DS-JL0044-REG	a	HR-116Q-GP06-DS-JL0045-FD	HR-116Q-GP06-DS-JL0046-FS		
HR-117Q-MW01	HR-117Q-MW01-SS-JM0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW01-DS-JM0002-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-117Q-MW02	HR-117Q-MW02-SS-JM0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW02-DS-JM0004-REG	a				
HR-117Q-MW03	HR-117Q-MW03-SS-JM0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW03-DS-JM0006-REG	a	HR-117Q-MW03-DS-JM0007-FD			
HR-117Q-MW04	HR-117Q-MW04-SS-JM0008-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW04-DS-JM0009-REG	a				
HR-117Q-MW05	HR-117Q-MW05-SS-JM0010-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW05-DS-JM0011-REG	a				
HR-117Q-MW06	HR-117Q-MW06-SS-JM0012-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW06-DS-JM0013-REG	a				
HR-117Q-MW07	HR-117Q-MW07-SS-JM0014-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW07-DS-JM0015-REG	a				
HR-117Q-MW08	HR-117Q-MW08-SS-JM0016-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-MW08-DS-JM0017-REG	a				
HR-117Q-GP01	HR-117Q-GP01-SS-JM0016-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-117Q-GP01-DS-JM0017-REG	a	HR-117Q-GP01-DS-JM0018-FD	HR-117Q-GP01-DS-JM0019-FS		
HR-151Q-MW01	HR-151Q-MW01-SS-JP0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-151Q-MW01-DS-JP0002-REG	a				
HR-151Q-GP01	HR-151Q-GP01-SS-JP0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-151Q-GP01-DS-JP0004-REG	a				
HR-151Q-GP02	HR-151Q-GP02-SS-JP0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-151Q-GP02-DS-JP0006-REG	a	HR-151Q-GP02-DS-JP0007-FD			
HR-151Q-GP03	HR-151Q-GP03-SS-JP0008-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-151Q-GP03-DS-JP0009-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-151Q-GP04	HR-151Q-GP04-SS-JP00010-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-151Q-GP04-DS-JP00011-REG	a	HR-151Q-GP04-DS-JP0012-FD	HR-151Q-GP04-DS-JP0013-FS		
HR-200Q-GP01	HR-200Q-GP01-SS-JQ0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-200Q-GP01-DS-JQ0002-REG	a				
HR-200Q-GP02	HR-200Q-GP02-SS-JQ0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-200Q-GP02-DS-JQ0004-REG	a	HR-200Q-GP02-DS-JQ0005-FD			
HR-201Q-MW01	HR-201Q-MW01-SS-JR0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-201Q-MW01-DS-JR0002-REG	a				
HR-201Q-MW02	HR-201Q-MW02-SS-JR0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-201Q-MW02-DS-JR0004-REG	a	HR-201Q-MW02-DS-JP0005-FD			
HR-228Q-MW01	HR-228Q-MW01-SS-JS0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-228Q-MW01-DS-JS0002-REG	a				
HR-228Q-MW02	HR-228Q-MW02-SS-JS0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-228Q-MW02-DS-JS0004-REG	a	HR-228Q-MW02-DS-JS0005-FD			
HR-229Q-MW01	HR-229Q-MW01-SS-JT0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-229Q-MW01-DS-JT0002-REG	a				
HR-231Q-MW01	HR-231Q-MW01-SS-JU0001-REG	0-1	HR-231Q-MW01-SS-JU0002-FD			TAL Metals, Nitroexplosives, Perchlorate
	HR-231Q-MW01-DS-JU0003-REG	a				
HR-232Q-MW01	HR-232Q-MW01-SS-ECC0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-MW01-DS-ECC0002-REG	a				
HR-232Q-MW02	HR-232Q-MW02-SS-ECC0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-MW02-DS-ECC0004-REG	a				
HR-232Q-MW03	HR-232Q-MW03-SS-ECC0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-MW03-DS-ECC0006-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-232Q-MW04	HR-232Q-MW04-SS-ECC0007-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-MW04-DS-ECC0008-REG	a				
HR-232Q-MW05	HR-232Q-MW05-SS-ECC0009-REG	0-1			HR-232Q-MW05-SS-ECC0009-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-MW05-DS-ECC0010-REG	a				
HR-232Q-MW06	HR-232Q-MW06-SS-ECC0011-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-MW06-DS-ECC0012-REG	a				
HR-232QX-MW07	HR-232QX-MW07-SS-ECC0013-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW07-DS-ECC0014-REG	a				
HR-232QX-MW08	HR-232QX-MW08-SS-ECC0015-REG	0-1	HR-232QX-MW08-SS-ECC0016-FD	HR-232QX-MW08-SS-ECC0017-FS		TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW08-DS-ECC0018-REG	a				
HR-232QX-MW09	HR-232QX-MW09-SS-ECC0019-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW09-DS-ECC0020-REG	a				
HR-232QX-MW10	HR-232QX-MW10-SS-ECC0021-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW10-DS-ECC0022-REG	a				
HR-232QX-MW11	HR-232QX-MW11-SS-ECC0023-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW11-DS-ECC0024-REG	a				
HR-232QX-MW12	HR-232QX-MW12-SS-ECC0025-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW12-DS-ECC0026-REG	a				
HR-232QX-MW13	HR-232QX-MW13-SS-ECC0027-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW13-DS-ECC0028-REG	a				
HR-232QX-MW14	HR-232QX-MW14-SS-ECC0029-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW14-DS-ECC0030-REG	a				
HR-232QX-MW15	HR-232QX-MW15-SS-ECC0031-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW15-DS-ECC0032-REG	a			HR-232QX-MW15-DS-ECC0032-MS/MSD	

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-232QX-MW16	HR-232QX-MW16-SS-ECC0033-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW16-DS-ECC0034-REG	a				
HR-232QX-MW17	HR-232QX-MW17-SS-ECC0035-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW17-DS-ECC0036-REG	a				
HR-232QX-MW18	HR-232QX-MW18-SS-ECC0037-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW18-DS-ECC0038-REG	a				
HR-232QX-MW19	HR-232QX-MW19-SS-ECC0039-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-MW19-DS-ECC0040-REG	a				
HR-232QX-GP01	HR-232QX-GP01-SS-ECC0041-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-GP01-DS-ECC0042-REG	a				
HR-232QX-GP02	HR-232QX-GP02-SS-ECC0043-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-232QX-GP02-DS-ECC0044-REG	a	HR-232QX-GP02-DS-ECC0045-FD			
101			20		10	9

[a] Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

REG - Field sample.
FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
HR - Chemical warfare material.

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The subsurface soil sampling rationale is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot bgs in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 2000).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithogical log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analyses. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicate readings exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analyses. Subsurface soil samples will be selected for analyses from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analyses. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

Seventy-six permanent residuum monitoring wells will be installed at the Ranges West of Iron Mountain Road. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for the monitoring well locations are presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to

install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside diameter, Schedule 40, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. The well will be installed so the well screen straddles the water table.

Soil samples for lithology will be collected continuously every 5 feet to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter, split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials (ASTM) Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the 76 monitoring wells completed at the Ranges West of Iron Mountain Road, as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationale

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations, depths, and required QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from each of the three monitoring wells installed at the sites to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000a). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road,
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-181-MW01	HR-181-MW01-GW-RB3001-REG	Groundwater	a			HR-181-MW01-GW-RB3001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorates
HR-181-MW02	HR-181-MW02-GW-RB3002-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorates
HR-181-MW03	HR-181-MW03-GW-RB3003-REG	Groundwater	a	HR-181-MW03-GW-RB3004-FD	HR-181-MW03-GW-RB3005-FS		TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorates
HR-194-MW01	HR-194-MW01-GW-RC3001-REG	Groundwater	a			HR-194-MW01-GW-RC3001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorates
HR-194-MW02	HR-194-MW02-GW-RC3002-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorates
HR-194-MW03	HR-194-MW03-GW-RC3003-REG	Groundwater	a	HR-194-MW03-GW-RC3004-FD	HR-194-MW03-GW-RC3005-FS		TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorates
HR-73Q-MW01	HR-73Q-MW01-GW-JF3001-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-73Q-MW02	HR-73Q-MW02-GW-JF3002-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-73Q-MW03	HR-73Q-MW03-GW-JF3003-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-73Q-MW04	HR-73Q-MW04-GW-JF3004-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-91Q-MW01	HR-91Q-MW01-GW-JH3001-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-91Q-MW02	HR-91Q-MW02-GW-JH3002-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-91Q-MW03	HR-91Q-MW03-GW-JH3003-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-91Q-MW04	HR-91Q-MW04-GW-JH3004-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-115Q-MW01	HR-115Q-MW01-GW-JK3001-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
							TAL Metals, Nitroexplosives,

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road,
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-115Q-MW02	HR-115Q-MW02-GW-JK3002-REG	Groundwater	a				Perchlorates
HR-115Q-MW03	HR-115Q-MW03-GW-JK3003-REG	Groundwater	a	HR-115Q-MW03-GW-JK3004-FD			TAL Metals, Nitroexplosives, Perchlorates
HR-116Q-MW01	HR-116Q-MW01-GW-JL3001-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-116Q-MW02	HR-116Q-MW02-GW-JL3002-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-116Q-MW03	HR-116Q-MW03-GW-JL3003-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-116Q-MW04	HR-116Q-MW04-GW-JL3004-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-116Q-MW05	HR-116Q-MW05-GW-JL3005-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-117Q-MW01	HR-117Q-MW01-GW-JM3001-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-117Q-MW02	HR-117Q-MW02-GW-JM3002-REG	Groundwater	a				TAL Metals, Nitroexplosives, Pechlorates
HR-151Q-MW01	HR-151Q-MW01-GW-JP3001-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates
HR-151Q-MW02	HR-151Q-MW02-GW-JP3002-REG	Groundwater	a				TAL Metals, Nitroexplosives, Perchlorates

[a]Sample depth will depend on where sufficient first water is encountered to collect a water sample.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
REG - Field sample.
QA/QC - Quality assurance/quality control.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
HR - Chemical warfare material.

required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP (IT, 2000a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Twenty-two surface water samples will be collected from drainage ditches/creeks of the Ranges West of Iron Mountain Road.

4.2.5.1 Sample Locations and Rationale

The surface water sampling rationale are listed in Table 4-1. The surface water samples will be collected from the proposed locations on Figure 4-1. The surface water sample designations and required QA/QC sample requirements are listed in Table 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

The surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and chain-of-custodies will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.6 Sediment Sampling

Twenty-two sediment samples will be collected from the Ranges West of Iron Mountain Road. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

4.2.6.1 Sample Locations and Rationale

The proposed locations for the sediment samples are shown in Figure 4-1. Sediment sampling rationale is presented in Table 4-1. The sediment sample designation and required QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 Sample Collection

Table 4-4

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-73Q-SW/SD01	HR-73Q-SW/SD01-SW-JF2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-73Q-SW/SD01-SD-JF1001-REG	Sediment	0-0.5			HR-73Q-SW/SD01-SD-JF1001-MS/MSD	
HR-91Q-SW/SD01	HR-91Q-SW/SD01-SW-JH2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-91Q-SW/SD01-SD-JH1001-REG	Sediment	0-0.5				
HR-114Q-SW/SD01	HR-114Q-SW/SD01-SW-JJ2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-114Q-SW/SD01-SD-JJ1001-REG	Sediment	0-0.5				
HR-115Q-SW/SD01	HR-115Q-SW/SD01-SW-JK2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-115Q-SW/SD01-SD-JK1001-REG	Sediment	0-0.5				
HR-115Q-SW/SD02	HR-115Q-SW/SD02-SW-JK2002-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-115Q-SW/SD02-SD-JK1002-REG	Sediment	0-0.5				
HR-116Q-SW/SD01	HR-116Q-SW/SD01-SW-JL2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-116Q-SW/SD01-SD-JL1001-REG	Sediment	0-0.5				
HR-116Q-SW/SD02	HR-116Q-SW/SD02-SW-JL2002-REG	Surface Water	N/A			HR-116Q-SW/SD02-SW-JL2002-MS/MSD	TAL Metals, Nitroexplosives, Perchlorates
	HR-116Q-SW/SD02-SD-JL1002-REG	Sediment	0-0.5				
HR-116Q-SW/SD03	HR-116Q-SW/SD03-SW-JL2003-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-116Q-SW/SD03-SD-JL1003-REG	Sediment	0-0.5				
HR-116Q-SW/SD04	HR-116Q-SW/SD04-SW-JL2004-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-116Q-SW/SD04-SD-JL1004-REG	Sediment	0-0.5				
HR-117Q-SW/SD01	HR-117Q-SW/SD01-SW-JM2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-117Q-SW/SD01-SD-JM1001-REG	Sediment	0-0.5				
HR-117Q-SW/SD02	HR-117Q-SW/SD02-SW-JM2002-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-117Q-SW/SD02-SD-JM1001-REG	Sediment	0-0.5				

Table 4-4

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-151Q-SW/SD01	HR-151Q-SW/SD01-SW-JP2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-151Q-SW/SD01-SD-JP1001-REG	Sediment	0-0.5	HR-151Q-SW/SD01-SD-JP1002-FD	HR-151Q-SW/SD01-SD-JP1003-FS		
HR-201Q-SW/SD01	HR-201Q-SW/SD01-SW-JR2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-201Q-SW/SD01-SD-JR1001-REG	Sediment	0-0.5	HR-201Q-SW/SD01-SD-JR1002-FD	HR-201Q-SW/SD01-SD-JR1003-FS		
HR-232QX-SW/SD01	HR-232QX-SW/SD01-SW-ECC2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD01-SD-ECC1001-REG	Sediment	0-0.5				
HR-232QX-SW/SD02	HR-232QX-SW/SD02-SW-ECC2002-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD02-SD-ECC1002-REG	Sediment	0-0.5				
HR-232QX-SW/SD03	HR-232QX-SW/SD03-SW-ECC2003-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD03-SD-ECC1003-REG	Sediment	0-0.5				
HR-232QX-SW/SD04	HR-232QX-SW/SD04-SW-ECC2004-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD04-SD-ECC1004-REG	Sediment	0-0.5				
HR-232QX-SW/SD05	HR-232QX-SW/SD05-SW-ECC2005-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD05-SD-ECC1005-REG	Sediment	0-0.5				
HR-232QX-SW/SD06	HR-232QX-SW/SD06-SW-ECC2006-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD06-SD-ECC1006-REG	Sediment	0-0.5			HR-232QX-SW/SD06-SD-ECC1006-MS/MSD	
HR-232QX-SW/SD07	HR-232QX-SW/SD07-SW-ECC2007-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD07-SD-ECC1007-REG	Sediment	0-0.5				
HR-232QX-SW/SD08	HR-232QX-SW/SD08-SW-ECC2008-REG	Surface Water	N/A	HR-232QX-SW/SD08-SW-ECC2009-FS	HR-232QX-SW/SD08-SW-ECC2010-FD		TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD08-SD-ECC1008-REG	Sediment	0-0.5				
HR-232QX-SW/SD09	HR-232QX-SW/SD09-SW-ECC2011-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorates
	HR-232QX-SW/SD09-SD-ECC1009-REG	Sediment	0-0.5				

MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

The sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sediment samples for volatile organic analysis will be collected in EnCore sampling devices. Sample documentation and chain-of-custodies will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.4 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either GPS or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983. Elevations will be referenced to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 (soon to be established on site).

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP. All areas must be cleared for UXO avoidance before any surveying activities will commence.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for the specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from the

Ranges West of Iron Mountain Road, Parcels 181(7) and 194(7), and will consist of the following list of analytical suites:

- Target compound list (TCL)volatile organic compounds (VOC) - Method 5035/8260B
- TCL semivolatile organic compounds - Method 8270C
- Target analyte list metals - Method 6010B/7000.
- Nitroexplosives - Method 8330
- Perchlorate – Method 314.

Samples collected at the remaining parcels (73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, and 232Q-X) will be analyzed only for the following list of analytical suites:

- TCL VOCs - Method 5035/8260B – groundwater only
- Target analyte list metals – Method 6010B/7000
- Nitroexplosives – Method 8330
- Perchlorate – Method 314.

All groundwater samples collected at the Ranges West of Iron Mountain Road will be analyzed for VOCs. In addition, all the sediment samples will be analyzed for the following list of parameters:

- Total organic carbon - Method 9060
- Grain size - ASTM D-421/D-422.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-5 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using CLP-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

Table 4-5

Analytical Samples
Ranges West of Iron Mountain Road
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples [a]: Field Dups (10%)	QA/QC Samples [a]: Splits w/ QA Lab (5%)	QA/QC Samples [a]: MS/MSD (5%)	QA/QC Samples [a]: Trip Blank (1/ship)	QA/QC Samples [a]: Eq. Rinse (1/wk/matrix)	EMAX: Total No. Analysis	QA Lab: Total No. Analysis
Ranges West of Iron Mountain Road: 98 water matrix samples (76 groundwater samples and 22 surface water samples); **224 soil matrix samples** (101 surface soil samples, 101 subsurface soil samples, 22 sediment samples) - Only 6 water matrix samples and 12 soil matrix samples will be analyzed for both TCL VOCs and TCL SVOCs, but all groundwater samples will be analyzed for VOCs													
TCL VOCs	8260B	water	normal	82	1	82	8	4	4	21	4	123	4
TCL SVOCs	8270C	water	normal	6	1	6	1	1	1		1	10	1
Tot TAL Metals	6010B/7000	water	normal	98	1	98	10	5	5		5	123	5
Nitroexplosives	8330	water	normal	98	1	98	10	5	5		5	123	5
Perchlorate	314	water	normal	98	1	98	10	5	5		5	123	5
TCL VOCs	8260B	soil	normal	12	1	12	1	1	1	3	1	19	1
TCL SVOCs	8270C	soil	normal	12	1	12	1	1	1		1	16	1
TAL Metals	6010B/7000	soil	normal	224	1	224	22	11	11		11	279	11
Nitroexplosives	8330	soil	normal	224	1	224	22	11	11		11	279	11
Perchlorate	314	soil	normal	224	1	224	22	11	11		11	279	11
TOC	9060	sediment	normal	22	1	22						22	0
Grain Size	ASTM D-421/D-422	sediment	normal	22	1	22						22	0
Ranges West of Iron Mountain Road:				1122			107	55	55	24	55	1418	55

[a]Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to:

EMAX Laboratories, Inc.
630 Maple Avenue
Torrance, California 90503
Attn: Elizabeth McIntyre
Tel: 610-618-8889
Fax: 610-618-0818

USACE Laboratory split samples are shipped to:

U.S. Army Engineer District, Savannah
Environmental & Materials District
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Tel: 678-354-0310

MS/MSD - Matrix spike/matrix spike duplicate.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/chain-of-custody records will be secured and included with each shipment of coolers to:

Attn: Elizabeth McIntyre
EMAX Laboratories, Inc.
630 Maple Avenue
Torrance, California 90503
Telephone: (310) 618-8889.

QA split samples collected for the USACE laboratory will be shipped to the following address:

U.S. Army Engineer District, Savannah
Environmental & Materials Unit
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Telephone: (678) 354-0310.

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range, is expected to include decontamination fluids and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for the Ranges West of Iron Mountain Road, Parcels 181(7), 194(7), 518(7), 73Q-X, 91Q-X, 114Q-X, 115Q, 116Q-X, 117Q-X, 129Q-X, 151Q, 200Q, 201Q, 228Q, 229Q-X, 231Q, 232Q-X, Washington Tank Range, and 1950 Rocket Launcher Range. The SSHP attachment will be used in conjunction with the installation-wide SHP.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

6.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, ***Fort McClellan Comprehensive Reuse Plan***, Fort McClellan Reuse and Redevelopment Authority of Alabama, prepared under contract to the Calhoun County Commission, November.

Foster Wheeler Environmental Corporation (Foster-Wheeler), 2000, ***Presentation to Fort McClellan BRAC Cleanup Team***, May.

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

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IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

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U.S. Army Corps of Engineers (USACE), 1997, ***Statement of Work for Task Order CK04, Site Investigation and Long Term Monitoring at Landfills #1, #2, and #3 at Fort McClellan, Alabama,*** September.

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plan***, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Engineer Office, 1946, ***1946 Reservation Map***, Mobile, Alabama.

U.S. Environmental Protection Agency (EPA), 1993, ***Data Quality Objectives Process for Superfund, Interim Final Guidance***, EPA 540-R-93-071, September.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	Amber
ANAD	Anniston Army Depot
APT	armor piercing tracer
ASP	Ammunition Supply Point
ASR	Archives Search Report, July 1999
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BFB	bromofluorobenzene
bgs	below ground surface
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
BZ	breathing zone
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CFC	chlorofluorocarbon
CG	cyanogen chloride
ch	inorganic clays of high plasticity
CK	carbonyl chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
COC	chain of custody
COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare materials, clear wide mouth
CX	dichloroformoxime
D	duplicate
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DDT	dichlorodiphenyltrichloroethane
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300 Site
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	fire training area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow stem auger
HTRW	hazardous, toxic, and radioactive waste
I	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion

List of Abbreviations and Acronyms (Continued)

Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
IT	IT Corporation
ITEMS	IT Environmental Management System ™
J	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimer
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	milliSiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchlorethene
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
R	rejected
RCRA	Resource Conservation and Recovery Act
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone
SEMS	Southern Environmental Management & Specialties
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
sm	silty sands; sand-silt mixtures
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list

TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validated qualifier
VX	nerve agent (O-ethyl-S- [diisoproplaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

APPENDIX A

MINICAMS SCREENING PROCEDURE
(SAIC Remedial Investigation Report, Fort McClellan, Alabama, August, 1995)

MINICAMS Screening Procedure[a]

The Miniature Continuous Air Monitoring System (MINICAMS) units were operated by two U.S. Army Technical Escort Unit (USATEU) teams according to their Standard Operating Procedure (SOP). The MINICAMS units obtain a time weighted average (TWA) concentration by analyzing vapors produced by thermal desorption from a soil sample. The thermal desorption was effected by heating each sample to approximately 70 degrees Fahrenheit (°F) in a controlled environment. The relationship between the concentration of CWA detected in the desorbed vapor sample and the concentration of CWA contained in the soil is variable and depends on the lithology, moisture content, and pH of the soil sample. In general, more CWA vapor is recovered from coarse soils than from fine-grained soils at an optimum moisture content that varies with soil type (Sage and Howard 1989). TWA concentrations for HD, GB, and VX are established by the Surgeon General of the United States and are shown below:

Agent	TWA* (mg/m^3)	TWA* (ng/L)	MINICAMS Detection Limit* (relative units)
HD	.003	3	1
GB	.0001	0.1	.005
VX	.00001	0.01	.005

*Data provided by CMS Research Corporation (1993, written communication (SAIC, 1995).

The MINICAMS system is normally set up to report concentrations in relative units. For example, if a concentration of 0.003 milligrams per cubic meter (mg/m^3) of HD is detected by the MINICAMS, it is reported as 1.00 TWA in relative units. If a concentration of 0.00001 mg/m^3 of VX is detected, it is reported as 1.00 TWA. Thus, the TWA reading has the same significance no matter which agent is being detected. The TWA reading reported for a given agent may be converted to mg/m^3 simply by multiplying the reported TWA reading by the definition given above. For example, a reading of 0.5 TWA for GB corresponds to 0.00005 mg/m^3.

Ideally, the unit will report a concentration reading of 1.00 TWA each time the proper quantity of agent is injected into the MINICAMS after calibration. The alarm level for the MINICAMS is set to correspond to a 95 percent confidence level, which would sound an alarm if the instrument was challenged with the equivalent of 1.00 TWA of agent. Statistical studies have shown that an alarm level of 0.80 TWA is a suitable setpoint for the MINICAMS to achieve a 95 percent

confidence level. A 1.00 TWA challenge of the MINICAMS will result in a concentration reading greater than or equal of 0.80, 95 percent of the time, resulting in an alarm.

The following procedure was used to analyze soil samples using a MINICAMS unit at Fort McClellan:

- Approximately 50 grams of soil were collected with a decontaminated stainless-steel spoon trowel, or hand auger; deposited into a stainless-steel bowl; homogenized; and placed into a glass jar. Upon retrieval of a split-spoon sample, the soil in the tip of the sampler was removed with a stainless-steel spoon and placed into a glass jar.

- The soil sample was placed into the heater box (uncapped) and heated to the required minimum temperature of 70 degrees Fahrenheit. Evolved vapors were collected through Teflon® tubing attached to the heater box and were introduced directly into the MINICAMS unit. Once the MINICAMS reported the sample clear of CWA, the soil sample was removed, disposed of onsite, and the results logged by USATEU. Each sample was equilibrated in the heater box at the same temperature, for the same duration, and with approximately equal volume in each soil sample container.

- USATEU also conducted continuous air monitoring with the MINICAMS units during intrusive activities (i.e., drilling and trenching). The heater lines were placed as close to the borehole or test pit as conditions allowed. The soil vapors released by the intrusive activity were purged through the heater lines, adsorbed onto the trap, and desorbed into the column of the MINICAMS. The results of each cycle were logged by USATEU.

[a]Science Applications International Corporation, 1995, ***Draft Fort McClellan Remedial Investigation Report***, August.